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Southern Flight

October, 1942

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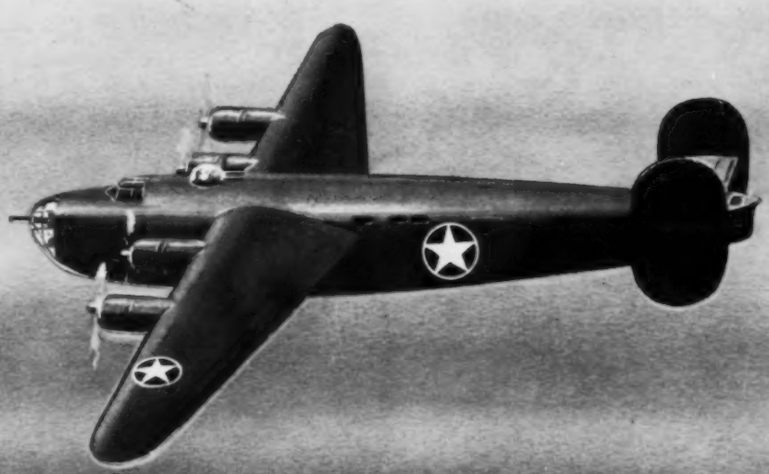
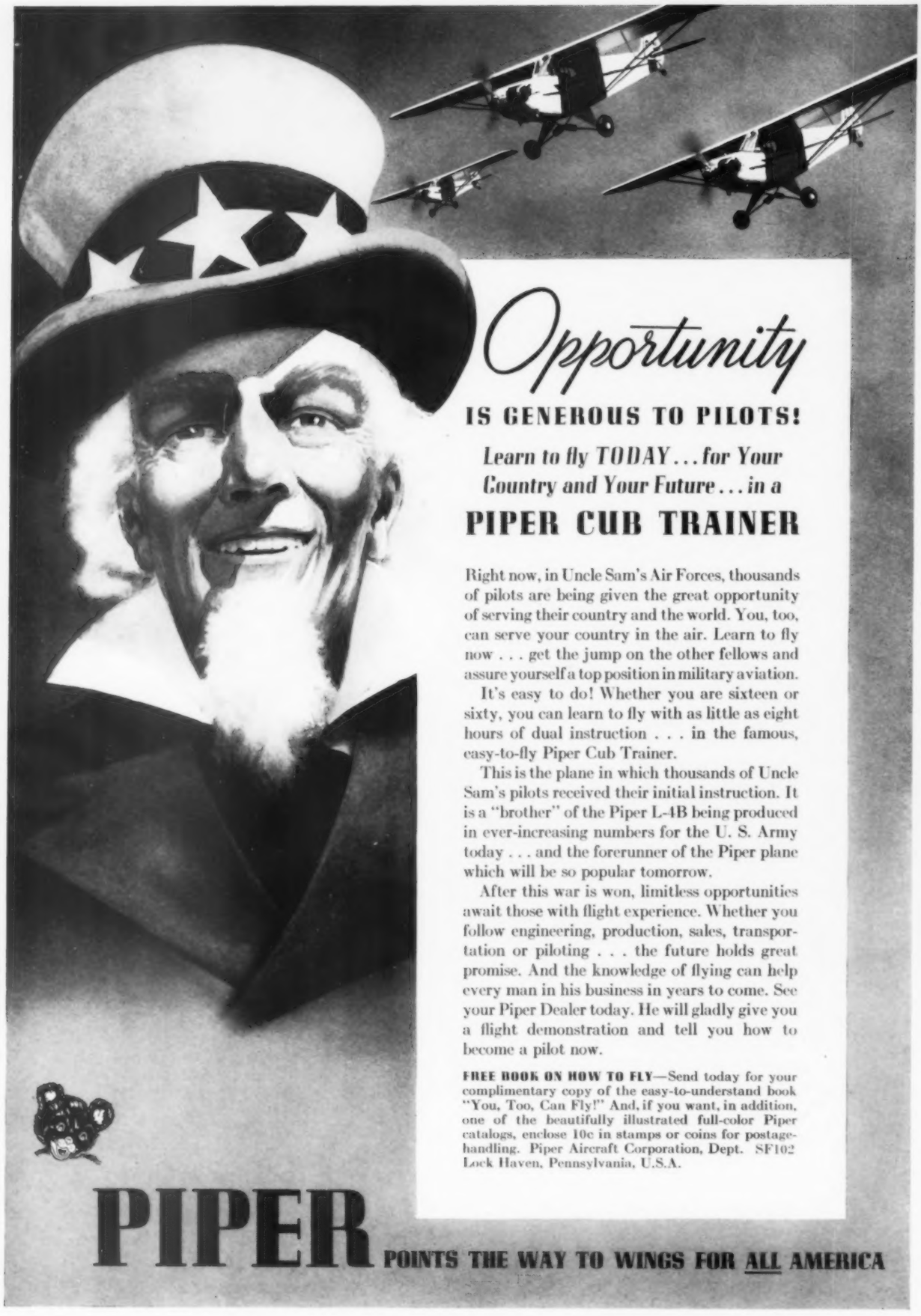
Liberators Strike Far and Wide

After ten months of all-out war, Consolidated Liberators have emerged as among the most versatile bombers in the world. Whether pounding the Axis with their destructive might or ferrying men and materials across the seven seas, these B-24's range far and wide to carry the fight to the enemy.

All are powered by dependable Pratt & Whitney Twin Wasp engines.

PRATT & WHITNEY AIRCRAFT
EAST HARTFORD, CONNECTICUT
ONE OF THE THREE DIVISIONS OF UNITED AIRCRAFT CORPORATION





Opportunity

IS GENEROUS TO PILOTS!

Learn to fly TODAY... for Your Country and Your Future... in a

PIPER CUB TRAINER

Right now, in Uncle Sam's Air Forces, thousands of pilots are being given the great opportunity of serving their country and the world. You, too, can serve your country in the air. Learn to fly now . . . get the jump on the other fellows and assure yourself a top position in military aviation.

It's easy to do! Whether you are sixteen or sixty, you can learn to fly with as little as eight hours of dual instruction . . . in the famous, easy-to-fly Piper Cub Trainer.

This is the plane in which thousands of Uncle Sam's pilots received their initial instruction. It is a "brother" of the Piper L-4B being produced in ever-increasing numbers for the U. S. Army today . . . and the forerunner of the Piper plane which will be so popular tomorrow.

After this war is won, limitless opportunities await those with flight experience. Whether you follow engineering, production, sales, transportation or piloting . . . the future holds great promise. And the knowledge of flying can help every man in his business in years to come. See your Piper Dealer today. He will gladly give you a flight demonstration and tell you how to become a pilot now.

FREE BOOK ON HOW TO FLY—Send today for your complimentary copy of the easy-to-understand book "You, Too, Can Fly!" And, if you want, in addition, one of the beautifully illustrated full-color Piper catalogs, enclose 10c in stamps or coins for postage-handling. Piper Aircraft Corporation, Dept. SF102 Lock Haven, Pennsylvania, U.S.A.

PIPER

POINTS THE WAY TO WINGS FOR ALL AMERICA

Tons against Time

Rails end . . . seas have shores . . . but cargoes sent by air go directly to destination without transhipment. For swift tonnage transport which reaches everywhere, Wright engines supply the power.

WRIGHT *Aircraft Engines*

POWER THE TONNAGE OF THE AIR

Southern Flight

The only complete monthly digest of aeronautics in the South and Southwest

OCTOBER, 1942 VOL. XVIII, NO. 4

CONTENTS

SPECIAL FEATURES

A DAY WITH THE EXPERTS—by Joe Flukes 16

STREAMLINED RULES FOR CIVIL FLYING—by Charles I. Stanton . 21

GLOBAL AIRLINES FOR VICTORY—by Esther H. Forbes . . 22

VOLUNTEER SOLDIERS AID HIGH ALTITUDE RESEARCH PROGRAM 24

"I JOINED THE NAVY AND LEARNED HOW TO FLY ALL OVER AGAIN"—by Lieut. Robert F. Davis 24

ARMY-NAVY "E" FOR TEXAS—by Jim Chambers 28

HOW A BATTERED LOCKHEED ESCAPED THE JAPS IN SUMATRA 30

REMOVING BROKEN DRILLS—by Henry J. Burnett and Charles E. Hansling 40

VERSATILITY UNLIMITED—by James R. Fitzpatrick 43

MINIMUM OF METAL IN RYAN'S PLYWOOD TRAINERS . . 44

THEY MADE THEIR OWN TOOLS AND WON THE ARMY-NAVY "E"—by Tony Hagmann and Hazel Strong . . 46

REGULAR FEATURES

JUST AMONG OURSELVES—Editorial Comment 12

THE SKY'S THE LIMIT—by Bill Green 26

CIVIL AIR PATROL HANDBOOK—Second installment . . . 31

YOUR INDUSTRY—News of the Month in Review 50

HEADLINERS 56

PORTS OF CALL—Correspondence from the Airports and Airways . 58

FLYING WITH THE CIVIL AIR PATROL 62

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REVVING UP

A PIONEER PASSES—Those who knew him were saddened when Lieut. Col. William C. Ocker passed away on September 16 at Walter Reed General Hospital. Few pioneers had endured such hardships as befell the father of blind flying, but the world will long remember and honor Bill Ocker for his great contribution to the coming Air Age.

★ ★ ★

HILL-BILLY TIGERS—"China Red" Probst, after a year of flying for Claire Chennault, tells us the Flying Tigers got more Japs on the ground than in the air. They strafed all kinds of targets, including a strong column of Jap armored trucks located by the British. . . . "We got 'em," says China Red, "but they weren't trucks. They were elephants!" . . . Once a twin-engined Jap fighter tricked the Tigers by banking close around a series of tall, cone-shaped peaks, edging back toward his lines peak by peak. Finally a P-40 barged straight in and got him, almost ramming the mountain to do it. . . . Back home, China Red's 1-A in the draft, but hunting a job testing.

★ ★ ★

LIVE AND LEARN—The publicity-mad auto industry has found another fable. It now claims the war in the air will be won sooner because the auto makers figured out a way to mass-produce propellers! What do they think Hamilton-Standard and Curtiss, who licensed them, have been doing?

★ ★ ★

WISE WORDS—In a classic opinion fourteen years ago, Mr. Justice Cardozo of the U. S. Supreme Court had this to say: "Aviation today is an established method of transportation. The future, even the near future, will make it still more general. The city that is without the foresight to build ports for the new traffic, may soon be left behind in the race for competition. Chalcedon was called the City of the Blind, because its founders rejected the nobler site of Byzantium. The need for vision of the future, in the government of cities, has not lessened with the years. The dweller within the gates, even more than the stranger from afar, will pay the price of blindness."

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EYES, EARS AND A STRONG ARM —FOR THE NAVY!

DESTINED TO SEEK OUT AND STRIKE DOWN the enemy on the seven seas, new Ryan-built Navy SOR-1 warplanes will soon be rolling off our assembly lines in volume to join the growing airmadas of the U.S. and United Nations.

TWENTY YEARS OF RYAN "KNOW HOW" insures both quantity and quality production of these formidable planes, built to better perform one of the biggest jobs at hand—scouting the seas to provide air protection and striking power against Axis submarines and war ships. All-out production of these Navy aircraft is but one of many Ryan assignments for victory.

RYAN AERONAUTICAL COMPANY

San Diego, California

MEMBER, AIRCRAFT WAR PRODUCTION COUNCIL, INC.

RELY ON **Ryan**

A NAME OF MILITARY SIGNIFICANCE

1922 A Leader in Air Progress for Twenty Years 1942

Read 'em and Weep

(for the Japs – if you can)

The Bomber That Broke the Japs' Hearts at Midway

MARTIN BOMBERS SINK JAP CRUISER

Direct Hit Scored On Plane Carrier In Aleutian Island Battle

United States torpedo planes sank a Japanese cruiser and scored a direct hit on an aircraft carrier of the main Japanese task force attacking the Aleutian Islands, it was flying Martin B-26's as torpedo

smooth song of power
)0 horsepower engines,
ces' newest champion
through its paces over
the hands of Uncle
MacDill field.
Martin B-26 medium
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il, from its transpar-
e bombardier sits, to
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and tested and has
in mortal combat.
* *
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based in the islands
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burning and sink-
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their crews could
here been a hun-
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d have escaped to

s filled the skies
st of their anti-

their valiant crews did not return to their bases, but the score was 10 men and two $200,000 planes for two Jap carriers, each carrying over 1000 men in its crew and worth several million dollars. And adding to the score, the planes from the enemy carriers, which found no place to roost, went down in the Pacific.

* * *

The B-26's scored again in the battle of the Aleutians by sinking a cruiser and putting an aircraft carrier out of action.

They also struck hard at Cologne in Germany, in the Mediterranean, and in Coral sea, proving that whether the objective is an enemy base on land or a battleship at sea, the medium-size, medium range, but tremendously swift medium bomber, of which the 26 is today's shining example, can blast it at smaller loss than any other weapon.

Brig. Gen. Jimmy Doolittle has let the world know what he thought of the B-26 by using one on various military missions since he led the raid on Tokyo. That particular job was done in

B-25's which is just about as effective as its sister 26 but not quite as fast. It was General Doolittle who gave MacDill and Tampa their first glimpse of the 26 when he landed here about six weeks ago.

* * *

What makes the B-26 one of the most potent bomber-torpedo planes in the world today? Just a look at it will

Allies Compare Planes:

Martin Bombers Best Against Foe

By HAROLD GUARD
United Press Staff Correspondent.

SOMEWHERE IN AUSTRALIA, Aug. 7.—Eight months of war have taught the Allies that pre-Pearl Harbor conceptions of the Japanese as poor fliers using inferior planes were wrong.

Any American pilot will tell you that the Japanese flier knows the score and that the improved Zero plane is one of the world's finest fighters.

The fact that Allied planes have proved a match for Zeroes on the 2,000-mile front north of Australia is a tribute to their pilots' flying ability.

MARTIN B-26 BEST

The American-made fighters that go against the Zeros are the Bell Airacobra and the Curtiss Kittyhawk, but it is the Martin twin-motored Marauder bomber—the B-26—that battle reports show to be the most effective.

American pilots like their own planes but they frequently express a wish that they had a little more of the Zero's all-around capabilities, especially its ability to climb fast and get on top in combat and its wide operational range.

Every pilot tried to get above his opponent in a dogfight and that's where the Japanese plane seems to have the edge. I recall an occasion in which several pilots told of surrounding a lone Zero. They figured they had it tagged. One said:

"And then what does he do? He goes straight up and leaves us

embodied in its construction. The engine is of the Pratt & Whitney type. German and American ideas are noted in the instrument panel arrangements.

Many structural features ape those of the British Hurricane and the armament is much like that of British fighters.

It was tested for years against the Chinese, for the Japanese apparently used China as a laboratory for the machines they later used against the United Nations.

FARES BETTER

A study of Army communiques shows that the Martin bomber has fared better against the Japanese than the Airacobras and the Kittyhawks. The Zero can outrace the twin-motored heavier Martin, but it can't outgun it and it cannot take the steep dives or fly at low level with the American plane.

Once the B-26 is in the air it can take care of itself, and pilots say the Japanese have a healthy respect for it. There have been instances where a B-26's cannon literally tore Zeros to pieces, and many pilots believe that the best plane to whip the Zero will be one somewhere between the B-26 and the fighters they now are using, embodying the best of both

Martin

B-26 BOMBER

Builders of Dependable Aircraft Since 1909

CLOSED TILL AFTER HITLER'S FUNERAL

THIS IS THE SIGN that hangs on the bolted doors of a small repair shop near Fort Worth, Texas. A young man in his twenties, who used to work here, was one of the gallant band who fought on Bataan. His fifty-year-old father, owner of the shop, and two 'teen-age brothers are fighting men, too. They're building planes for North American.

Not all our employees, of course, have the example of a son or brother in the armed forces to inspire them. But there's not a single North American worker who doesn't understand his personal stake in victory, who isn't grimly proud of his part in bringing the day of victory closer.

This will to win is the foundation for North American teamwork. It makes bombers, fighters, and training planes come out of our plants *fast*. It is the reason why, instead of "freezing" designs, we steadily improve our planes, making each one the very best plane that we can produce on any given day.

Some day, "after Hitler's funeral," North American teamwork will be building planes to dominate the skies of peace. Until then the sweetest music to our ears is the chuffing of trains delivering materials to us, the hum of production, the full-throated roar of each new North American plane as it flies away to strike at America's enemies.

NORTH AMERICAN AVIATION, INC.

Main Plant, Inglewood, Calif.

Member, Aircraft War Production Council, Inc.

NORTH AMERICAN *Sets the Pace!*

Out of Range!

ABOVE the war clamor for air-borne cargo this fact stands out crystal clear: Douglas has built, is building and will continue to build in ever greater volume two and four engine cargo carriers that *today* are "delivering the goods" out of the range of submarines. Already bridging time and distance in this global war, Douglas fleets of combat transports will soon become mighty airmadas of supply to overwhelm the enemy wherever he may be.

Douglas Aircraft Company, Inc.

DOUGLAS

MEMBER AIRCRAFT WAR PRODUCTION COUNCIL, INC.

BOMBER-FIGHTERS: SBD "DAUNTLESS" • "HAVOC" • TBD "DEVASTATOR"
WAR TRANSPORTS: DC-3 • C-47 • C-54 BOMBERS: A-20 • "BOSTON"

Triple-threat

One of the best ways to put the squeeze on the Axis is to produce better airplanes, faster.

This giant, triple-action press—using hydraulic, pneumatic and hydromatic pressure—is built for that job.

Built to the specifications of Boeing engineers, this press and a twin at Boeing's Midwest plant are unique in the aircraft industry. They are monsters that form steel, duraluminum or aluminum with equal ease.

The job of this press is to squeeze out airplane parts, to make them exactly alike, and to make them fast. Right now it is turning out fillets, angles, cowlings, stiffeners, bulkhead channels and exhaust shrouds for the Flying Fortress.*

It makes some of these parts 75 times faster than the machine it replaced.

This performance is one of the many reasons why Boeing production is steadily increasing, why Boeing was selected as the first aircraft company to receive the Army-Navy award for high achievement in production. (The rate of output of Flying Fortresses is now more than three times what it was on the day of Pearl Harbor.)

The pressure is on at Boeing, day and night. This heavy press, by no means the most powerful of the Boeing presses, is a symbol of efficiency in airplane production. It is one of a team of presses, one of a team of thousands of machines, part of the unbeatable American system of combining men and machines to shape our ends.

The increase of efficiency in manufacture . . . for peace and war . . . is only one of the many different projects that form a constant part of the Boeing engineering schedule at Seattle and in the Middle West and Canada.

DESIGNERS OF THE FLYING FORTRESS • THE STRATOLINER • PAN AMERICAN CLIPPERS **BOEING**

*THE TERMS "FLYING FORTRESS" AND "STRATOLINER" ARE REGISTERED BOEING TRADE-MARKS

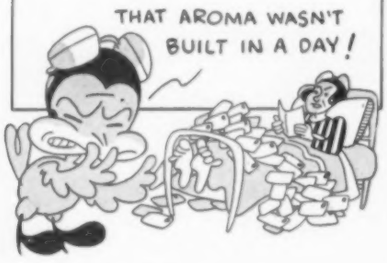
The Birdmen's Perch

Oh, see the little Major,
He's out upon a twig;
He promised to name Oily but
The job grew much too big.

The letters came in bunches—
The Major read and read,
He read while he was eating,
He read while in his bed.

He read under the shower;
He read the postal blitz
In restaurants and buses,
In Washington and Pitts.

The Major still is reading,
But takes time off to vow
That Oily will be christened
Just four weeks from now.



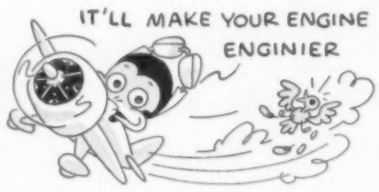
Major Al Williams

alias, "Tattered Wing Tips," Gulf Aviation Products Manager, Gulf Bldg., Pittsburgh, Pa.

MOIST, HAVE BEEN SOME THINGS THEY WET

Remember a while back, when scientists discovered a way to make water *wetter?*

Well, Gulf's scientists discovered a way to make oil *oilier* when they invented the Alchlor Process. For no matter how good the crudes, all oils contain molecules that form carbon and sludge, in addition to the molecules that actually lubricate.



Gulf's exclusive Alchlor Process gets *more* of these carbon and sludge makers out of Gulfpride than ordinary refining techniques would, leaving Gulfpride an *oilier* oil.

BRAINTWISTER (The Good Ferry)

The planes at Newfoundland Airport were joined by 1 flight of 7 new planes each day for a week. After each new flight arrived, half the planes on the field took off for England. At week's end, there were 8 planes left on the field.

How many were there in the beginning?

WHOPPER

Dear Major,

Recently one of the instructors went fishing, carrying as always a small bottle of Gulf Aviation Gasoline "for emergencies." After fishing a while, he ran out of bait and headed home to the Station. Half a mile up the path he saw a big snake with a frog in its mouth. He walloped the snake with a stick, took the frog, and started back to the river for more fishing.

But the death struggles of the snake were too much for his soft heart. Having no water, he gave the snake a shot of

G.A.G. and returned to the river, feeling a proper Christian.

He fished a bit before he felt a tug on his trousers. He looked down to see the same snake with another frog.

W. Bruce Haughton, Senior Instructor, Airplane Phase, Navy Air Service School, Florida

Gulf Oil Corporation and Gulf Refining Company... makers of

GULF AVIATION PRODUCTS

OIL IS AMMUNITION—USE IT WISELY!

BE SURE COMPRESSION DISTANCE OF A NEW PISTON IS THE SAME AS AN OLD ONE. A HIGH COMPRESSION...
HAND BRAWED & OILY
...PISTON IN STANDARD PISTON ENGINE HAS RESULTED IN REPEATED FAILURE OF THE NEW PISTON DUE TO OVERLOADING
...DETONATION OCCURRING WITH REGULAR 73 OCTANE FUEL. BUT YOU'LL PROBABLY NEVER HAVE TO REPLACE A PISTON...
... IF YOU USE THAT GOOD GULF AVIATION GASOLINE
G.A.G.

REPUBLIC P-47 THUNDERBOLT
"A Tremendous Package of Power"
"The shining symbol of American potential superiority in the air." . . . That is how one writer in a recent issue of a national magazine describes the Republic P-47 THUNDERBOLT, the great high-altitude fighter plane of the U. S. Army Air Forces. THUNDERBOLTS, shown in this flight photograph, are giant snub-nosed, single-place, all-metal planes, weighing in excess of 13,000 lbs. A 4-blade, 12-ft. Curtiss propeller driven by a Pratt & Whitney air-cooled radial 18-cyl. engine of 2,000 horsepower equipped with a special turbo-supercharger, gives these massive, heavily armored fighters a wide margin of superiority in speed, and ability to climb to altitudes so amazing that Government censorship forbids mention of them.

REPUBLIC AVIATION

REPUBLIC AVIATION CORPORATION

REPUBLIC AVIATION

FARMINGDALE, L. I., NEW YORK

Just Among Ourselves

YOU, TOO, CAN FLY

It's a corollary of war that credit is not always given where credit is genuinely due. Spectacular heroism and spectacular action invariably eclipse less dramatic but just as vital activities and heroism. A notable instance in the present war may be found in the unparalleled sacrifices in life and limb and the super-heroic performances of our merchant seaman, the real unsung heroes of this global struggle.

And on the home front there are likewise interesting and amazing parallels. The spectacular production records of our large manufacturers of military aircraft, now being justifiably recognized by Army and Navy "E" awards, and elephantine factories, thrust into the limelight by frequent visits from top government and military officials, are stealing the show. Unacknowledged and unnoticed thus far in the production picture is that vital segment at the very nerve-center of American aviation—the manufacturers of lightplanes and engines. No posies to them for the magnificent job they are doing; no recognition from the topside for the outstanding and significant contributions they are making in the newest branch of the aviation family tree, involving gliders and liaison aircraft.

Aeronca, Interstate, Piper and Taylorcraft, veteran builders of trainers and light sportplanes for the civilian market, were finally "discovered" a few months ago by our military men despite the fact that the lightplane executives had worn out the path to Washington, pleading for all-out employment of their facilities and utilitarian products. On past the eleventh hour the entire military thought only in terms of heavy stuff with tremendous horsepower not only in the realm of combat aircraft but in the field of trainers and non-combat types as well. After the lesson brought home by the air-borne invasion of Crete, a few of our more progressive military leaders sat up and began to take notice of our little band of civilian aircraft manufacturers who had never seen a government contract, whose closest experience with government patronage had been fairly healthy orders for trainers by private individuals engaged in civilian pilot training under Hinckley's program. These little ships chalked up such an unbelievable record in grinding out over a hundred thousand pilots with a safety factor that makes the Army and Navy blush in embarrassment, more and more military air experts became convinced that the American lightplane manufacturers might have something.

At their own expense, several of the pioneers managed to put over one of the cleverest experiments in the pre-Pearl Harbor era. They received official sanction to attach approximately twenty "flying jeeps" to the ground army during maneuvers in Texas and Tennessee. In every instance ground army commands were amazed. The "Grasshopper Fleet" proved itself so valuable in courier and liaison work, aerial reconnaissance and other special details, the ground units insisted on substantial orders for this type of equipment. They could land anywhere and maintenance offered no problem at all. Nor was it necessary to wait for the production of highly specialized military pilots to fly the little "jeeps." Any normal civilian or soldier could be taught to fly them in a matter of a few weeks. This convincing experiment during last year's maneuvers resulted in substantial contracts for the lightplane manufacturers.

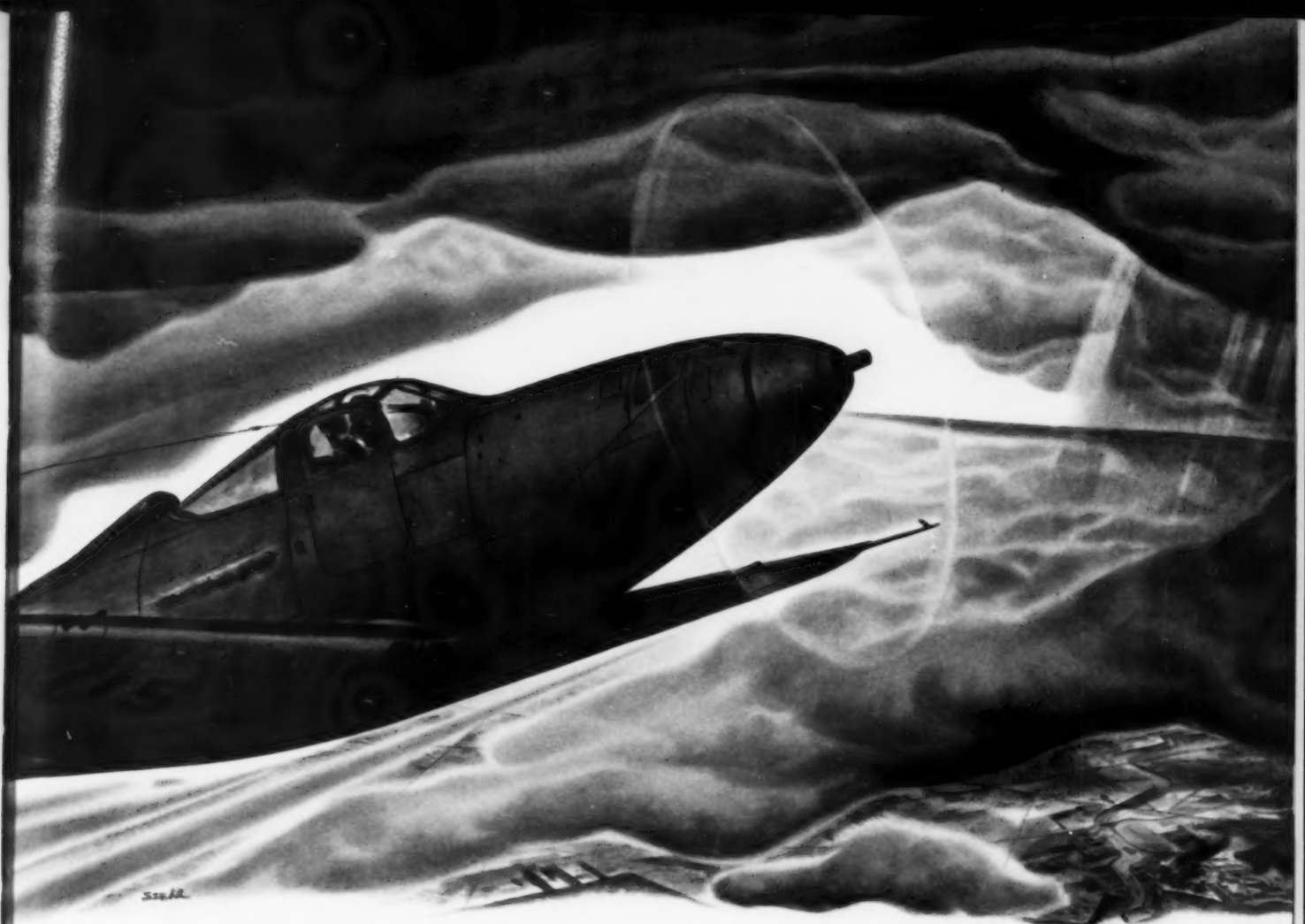
When the glider program came along, enterprising manufacturers converted their conventional-powered craft to gliders, overnight, for primary glider training. The hastily conceived glider program didn't have to wait for equipment. The lightplane boys began filling orders the very same week the orders arrived. We don't think there's a parallel in the entire history of American airplane production. Peculiarly enough, no one has recognized this magnificent record.

Characteristic of the foresight, the vigor and the enterprise of the lightplane manufacturers is the current advertising campaign of the Piper Aircraft Corporation, captained by that irrepressible dean and sage of America's healthy and productive lightplane industry, William T. Piper, Sr. You perhaps have noticed Piper's ads in the great general-interest magazines and in the aviation trade papers, reading: "You, too, can learn to fly—for your country . . . for your future." No more important or significant advertising message has been born in this war than Piper's appeal, advising that "never was it more advantageous to learn to fly. Today America needs pilots to win the war. Get the jump on the other fellows . . . learn to fly now and assure yourself a top position in military aviation."

All you have to do is check up on the tremendous number of civilian pilots who have gone into the air services — the younger pilots for combat after advanced training and the older pilots for non-combatant flight duty in scores of interesting and new branches of military aviation. "Remember," the ad states, "Pilots aren't born—they are trained—and you don't have to be a superman or endowed with some mystical skill to fly . . . Whether you're sixteen or sixty, if you are in normal health and possess normal judgment, YOU can learn to fly a Piper Cub with as little as eight hours of dual instruction!"

The lightplane industry will carry on as they have in the past, quietly and unnoticed. Those of us in aviation, however, will ever recognize and remember the torch they carried in the pre-war years, the vital link they formed in the chain that permitted immediate expansion of our air arm because civil aviation had trained pilots ready to pour into the fray, not tomorrow but today, and we will not soon forget their prolific production on short notice of necessary pre-glider and glider training equipment, a production record that cannot be duplicated in American industry.

Whether or not recognition comes to the lightplane people you can be sure of one thing—when this war becomes history and we enter the inevitable era of flight, they will be in there pitching and will take up where they left off in the coming postwar surge of civilian flying. Their intelligent and brilliant leadership, revealed more spectacularly than ever since war came, is silent witness to that fact.



Army Airacobra on a Fighting Front

HE'S BETTING *PLENTY* "on the Nose"

Sent "upstairs" to destroy an enemy attack, this flyer is placing his bets "on the nose" of his Army Airacobra.

For firing through the nose of his sleek and speedy fighter is a mighty cannon. A single shot, struck home, will blast the biggest bomber from the sky.

When plans were laid to build this "flying cannon" no gun so large had yet been mounted in a single-engine plane. And Bell Aircraft, too, did its betting "on the nose." We set a cannon out in front then built a fighter plane around it. It was a new and untried theory that called for pioneering skill and engineering genius.

Theorists said it wouldn't work—scoffed at the thought—while a staff of able aircraft engineers, assisted by our Army Air Force, set out to do the job.

Our answer is the Airacobra—the only single-engine fighter of its kind. With engine "aft" the pilot sits behind his cannon, as though he rode the breech, so deadly accurate is his aim. With all at stake he's betting plenty "on the nose." © Bell Aircraft Corporation, Buffalo, New York.

Airacobras for victory—

FUTURE PLANES FOR PEACE

BELL *Aircraft*

PACEMAKER OF AVIATION PROGRESS

CURTISS WARHAWKS

STRIKE WITH GUN AND BOMB!

To destroy the enemy in the skies and to demolish his armored forces and services of supply on the ground is the dual mission which is bringing new fame to bomb-equipped Curtiss P-40 Warhawks. These pursuit planes give the United Nations a new and deadlier type of weapon.

ARMY E NAVY

For outstanding accomplishment, Curtiss-Wright Buffalo workers are now proud possessors of the new joint Army-Navy Production Award.

CURTISS-WRIGHT
Corporation
AIRPLANE DIVISION

Send 10¢ for your copy of "Men and Wings"—a fascinating 96-page history of aviation by Assen Jordanoff. Airplane Division, Curtiss-Wright Corp., Buffalo, N. Y.

FIRST
Since the Birth of Aviation

1932 • The first Curtiss plane designed specifically as a fighter-bomber . . . a single seater, it was used by the U. S. Navy for operation from aircraft carrier.

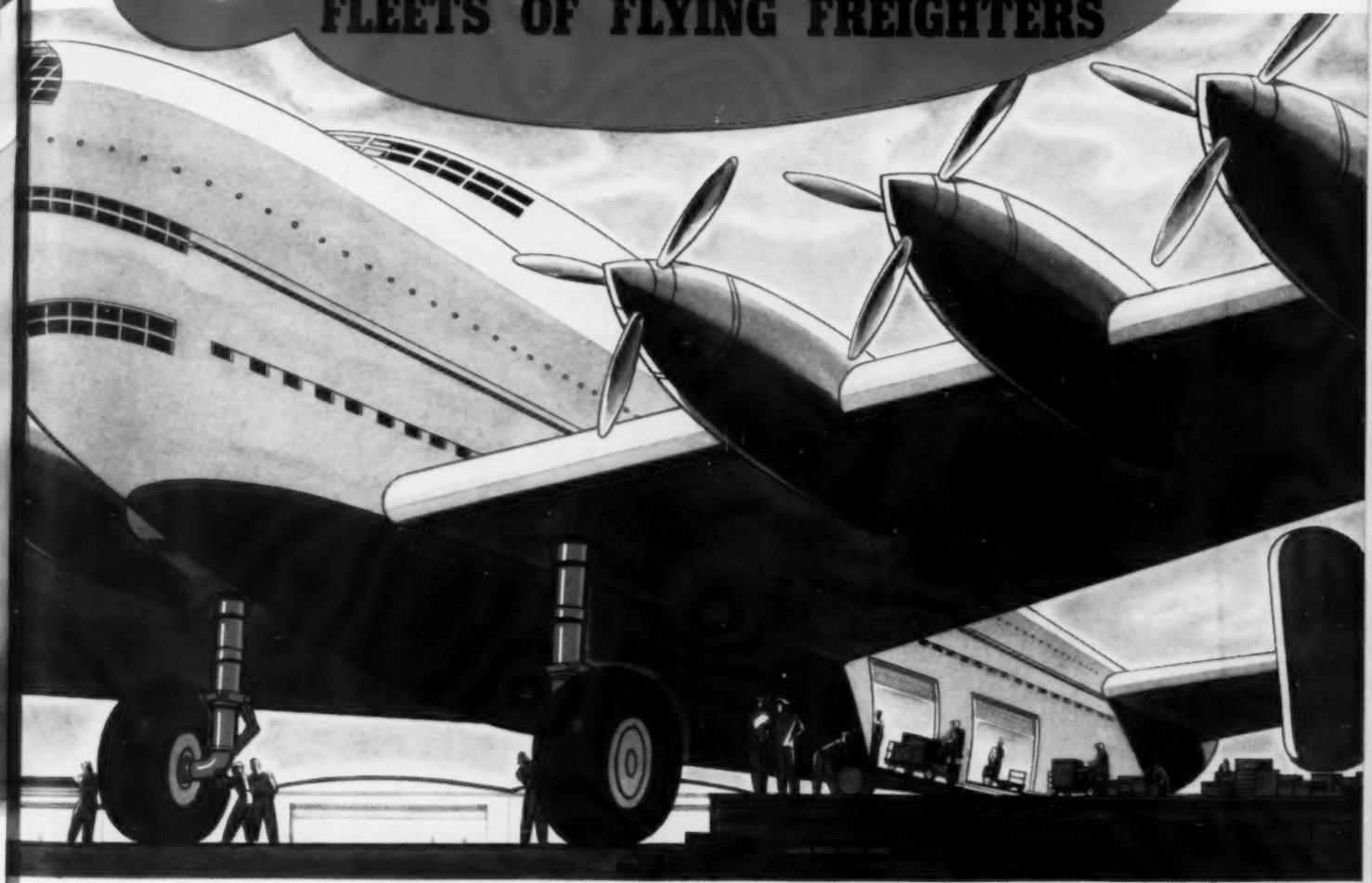
1937 • First fighter-bomber to use retractable landing gear — used by the Navy and by China, Argentina and Siam. Wing bombs were also carried.

1938 • The Hawk 75 . . . a monoplane fighter-bomber, incorporating heavier defense armament, increased maneuverability and carried a greater bomb load.

1940 • Curtiss P-40 Tomahawk . . . equipped the R. A. F. in the middle East and the American Volunteer Group in China, Java and Burma.

Here in America, soon

FLEETS OF FLYING FREIGHTERS



★ From the ashes of war's destruction shall rise a greater mode of transportation — the "*merchant aerine.*" Already the logistics of global warfare are requiring aerial armadas of military cargo-planes. When peace returns, they will have proved that flying freighters not only have greater speed and mobility, but also carry cargo at a low cost per ton-mile.

Aerols* enable these air leviathans to take-off and land with complete safety and efficiency. By cushioning the landing shock with hydraulic-pneumatic action they protect the plane, crew, and cargo. Aerols are also used on all other kinds of war planes — from the fiercest fighters to the biggest bombers, on every terrain and in every climate. Thus Aerols serve the cause of Victory today. Tomorrow, they will render an even greater service when the skyways are filled with fleets of flying freighters.

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AEROLS*

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A Day With the EXPERTS

By JOE FLUKES
Aviation Editor, The Pottawattamy Post

(EDITOR'S NOTE: In a frantic effort to clarify the confusion surrounding air power and its proper employment in this war, we stumbled upon a veteran aviation writer who has just returned from Washington where he attended a simulated conference of the nation's unchallenged experts on the subject. The following observations of Mr. Flukes do not reflect the views of this publication, which has opinions of its own, but his account of the conference does reveal the amazing outlook of our air power experts, both actual and self-appointed.)

BEFORE getting down to business, I want first to express my thanks to the Gessna Aircraft Company for sending me to Washington on an all-expense-paid trip—the first prize award in the recent Gessna essay contest. My essay presented reasons why the "Family Car of the Air" should have four instead of the conventional three landing wheels. So you see I owe a great deal to Dwane and Dwight Solace. Thanks, boys!

As for the simulated conference, it made history in more ways than one. Never before had so many aviation geniuses gathered in one small room. Never before have the potentialities of air power been so thoroughly discussed from all angles, including the fifth dimension, known as drift. Now that it is over I am convinced that what has happened in the war so far is as nothing compared to what these experts say should happen if they were in charge. We've seen only child's play to date. Of course, what disturbs my equilibrium is the fact that many of our sages hope to win the war with airplanes still on the drawing boards. How they expect to do this is beyond my ken.

The editors asked me to report the momentous conference objectively. After all, they said, there has been too damned much comment and commentating anyhow. Therefore I will set down here a verbatim record of what I heard, making no attempt to give my own conclusions or impressions.

First of all, here is the imposing list of participants: Lt. Gen. "Hip" Darnall (who served as chairman); Rear Admiral John H. Souers; Alex de Scaresky; Major Al Willman; Henry Fold; Col. Elliott Roseybelt; Col. John H. Julep; Henry J. Miser; Glenn Martian; Rubin Bleat; Dan Dogless; William B. Zipp; Hanson W. Bawling, Igor Liftorsky, and Cyrus Coldwail.

Opening Statement

Gen. Darnall: Gentlemen, welcome to Washington! On behalf of the joint Army-Navy Co-operative and Co-ordinating Air Board I wish to take this occasion to announce that effective with the second front, whenever it is opened, the Army and Navy air services have, by executive order of our President, been combined into one unified air force operating under a single command. Before we start formal discussion of momentous questions, I want to say that our autonomous air force is the answer to the nation's prayer. You celebrated experts may disagree on the details, but I am certain that insofar as the broader aspects of the over-all picture are concerned, all of us are of one mind. Now, to open this series of meetings, I suggest an informal round table discussion of generalities, beginning with production and ending with tactical employment of air power, so that we can get warmed up and know each other better. Gentlemen, the meeting is yours.

Col. Julep: Since I have another meeting this morning, I'm going to say a few words and leave. First of all, the old line, legitimate aviation industry produced 408.09 per cent more airplanes, engines and accessories last month than in the preceding month. I can't cite figures for fear of aiding and comforting the enemy, but this represents a gain of 1,021 per cent over the same month last year and 5,225 per cent gain over the same month two years ago. These figures do not include materiel delivered by the automobile companies or the shipbuilders because such figures are not yet available. As best as we can determine, the old line aviation concerns represented by the membership of the Aero Chamber are responsible for 98.23 per cent of all aviation production to date.

Mr. Fold: Col. Julep, do you mean to infer that we automobile people have failed to live up to expectations?

Col. Julep: Sir, if the shoe fits, please put it on. I infer nothing. I am interested only in facts and the record speaks for itself.

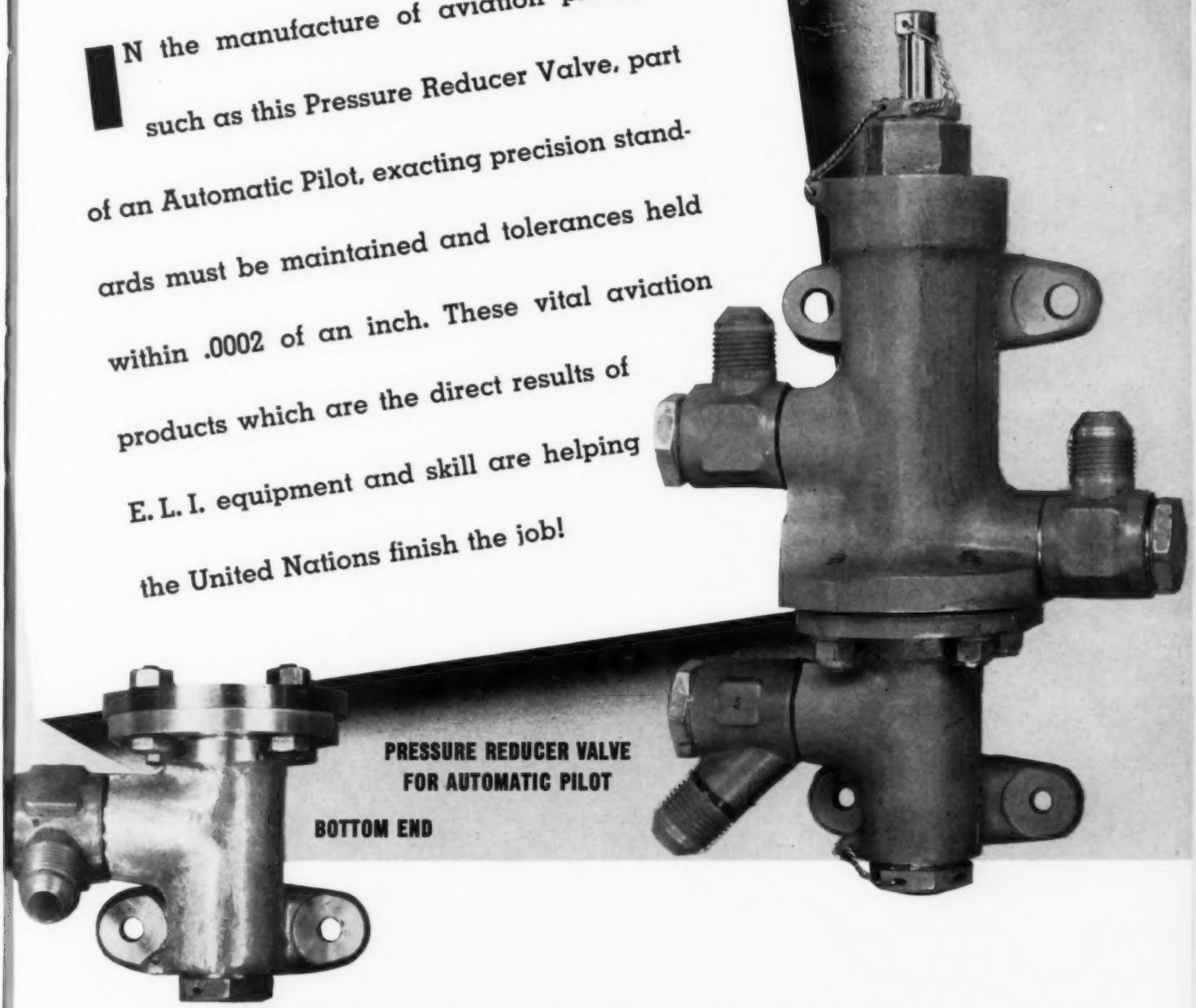
Mr. Fold: You must remember my company is just now getting under way at Running Willow. This will be the largest airplane plant in the world when completed. The final destruction of the Axis will come from Detroit!

Mr. Henry Miser: And the Pacific Northwest! Just wait 'til I get going! I'll show all you boys something! The Miser-Fews Aircraft Alliance is on the march. We'll win this war with cargo

(Continued on page 18)

PRECISION IS *Standard* WITH E.L.I.

IN the manufacture of aviation products such as this Pressure Reducer Valve, part of an Automatic Pilot, exacting precision standards must be maintained and tolerances held within .0002 of an inch. These vital aviation products which are the direct results of E. L. I. equipment and skill are helping the United Nations finish the job!



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Throughout the past eleven years, E. L. I. as one of the largest geophysical research organizations in the World has contributed many instruments and developed services vital to the Petroleum Industry.

A DAY WITH THE EXPERTS

(Continued from page 16)

planes! And Miser-Fews will build them!

(Col. Julep leaves)

Mr. Martian: Don't make us laugh. My company has been developing cargo planes for years. We do the developing and you come along and promote a contract!

Mr. Dogless: Miser, you've discovered nothing new. You're an interloper. You have been blessed with a loud mouth and a good press agent. With more talented press agentry than we're able to afford, you've simply managed to bulldoze the American people into believing you are the father of cargo aircraft. I suggest you go through file copies of *Aero Indigestion, Southern Plight* and *American Agitation* for past years and read up on the history of cargo-carrying aircraft. Ever hear of the DT's-4? We've been in production of that model for two years. I agree with Mr. Martian. You better stick to steamships.

Mr. Miser: Well, I have my contract and I'll build 'em! As big as they want 'em!

Mr. Coldwail: Hell, that's what Mr. Fold said two years ago, but I haven't seen any miracles at Running Willow yet! How about it, Henry?

Mr. Fold (ostensibly needled): Mass production of airplanes is fundamentally the same as mass production of mouse traps, coffee grinders or any other piece of equipment. You gentlemen forget that the prelude to mass production is tooling up. That's it—tooling up. The auto industry—and Fold—is still tooling up. A thousand bombers a day is entirely possible! Or cargo ships for that matter!

Mr. Coldwail: What do you think about it, Al?

Mr. Willman: Japan must be bombed to defeat!

Mr. de Scaresky: Don't forget pursuit, Willman. That's the trouble with

(Continued on page 20)

MUSTANG IN ENGLAND

SOMEWHERE IN ENGLAND a neatly-crated Mustang arrives at a camouflaged assembly shed. The trim fuselage is lifted and rolled into the shed by a motor crane, while another brings in the wing.

TEST FLIGHT FOLLOWS assembly. Polish units of the RAF praised the P-51's firepower, maneuverability and speed during the Dieppe raid, in which they gave air support to the Commandos by strafing German defenders and airdromes.

LANDING GEAR GOES ON and main wing assembly is turned over for installation of fuselage. The Mustang's radical low-drag wing design gives it the lowest drag coefficient of any airplane.

WORKMEN RAPIDLY ASSEMBLE the P-51 with all components slipping into place. Note radiator location behind and under cockpit—a daring but successful innovation, as is the cantilever-beam installation of the Allison engine.

Tough Customer

Concentrated firepower...a smashing blast of machine gun bullets and cannon shells spitting from one point—and heading hell-bent for the target.

That's the kind of firepower that makes a warplane a tough customer. That's the kind of firepower a Lockheed P-38 "Lightning" has...concentrated firepower that's designed in—not added on.

And it's firepower that is *always* concentrated...from muzzles to target, at any range...because it comes slamming from the nose of that unobstructed center cockpit. It's a battle-axe of lead and explosives that can slice off a Messerschmitt wing, or blast a Jap Zero to bits...and it's another reason why a 'plane christened "Interceptor Pursuit" in defense-minded days fits so well its new official air force title, "Fighter"! Lockheed Aircraft Corporation...Vega Aircraft Corporation...Burbank, California

for protection today, and progress tomorrow, look to

Lockheed

FOR LEADERSHIP

Member Aircraft War Production Council, Inc.

This Takes the Cake

Everybody remembers Captain Colin P. Kelly. His Flying Fortress sent the Japanese battleship HARUNA *to the bottom of the Pacific. President Roosevelt personally cited his accomplishment and he became one of the Army Air Forces' greatest heroes.*

Everybody knows what the late Captain Kelly did—that is, everybody but the Navy. In one of the most mystifying Navy utterances since the advent of the airplane, Lieut. Commander John S. Thach has denied Kelly's Flying Fortress destroyed the HARUNA.

"Not one major ship in this war has been sunk by horizontal bombing," said Thach recently, assigning credit to carrier-based dive and torpedo bombers for our wins.

Astonished newspapermen reminded him of the HARUNA. *Didn't the Army say Kelly got that one?*

With a you-heard-me attitude, Thach repeated himself deliberately: "Not one major ship in this war has been sunk by horizontal bombing." ★ ★ ★

A DAY WITH THE EXPERTS

(Continued from page 18)

a lot of you men. You would depend upon only one or two types and then, too, you are completely satisfied with present American aircraft. The airplane of the future will win this war, not the present sad collection of stepchild airplanes being turned out by American manufacturers. In my book "Air Punch To Victory" I proved by logical reasoning we're headed the wrong way.

Mr. Bawling: Scaresky, you proved nothing. Your book is a motley collection of the most confusing and contradictory statements I have ever had the misfortune to come upon. The fact that it's a best seller convinces me that the average American is a gullible cluck. I speak with authority when I tell you that carrier-based aircraft will win this war. As a veteran student of naval strategy and as an observer of aviation's recent ascendancy into the ranks of important war weapons, I have decided that only the carrier can make up for the lack of range our designers are responsible for in so many models. The Navy is wisely making up for these obvious discrepancies by building great carriers. Carriers will soon be the backbone of the fleet and they will win this war.

Mr. de Scaresky: I am glad to know, Bawling, the Navy has managed for a new backbone. It certainly lost its former one, the big battlewagon. But the carrier is even more vulnerable and even a greater liability than the big battleship.

Mr. Zipp: My new book makes that point very clear. My studies show that land-based aviation of the Army won the battles of Midway and the Coral Sea, in direct refutation of Naval communiques.

Mr. Bawling: Where did you get your dope, Zipp?

(At this point a messenger entered the room and handed General Darnall a paper.)

Gen. Darnall: Pardon me, gentlemen, but the Civil Air Patrol has just sunk another submarine off Hatteras. I'll be back shortly. (Exit Darnall).

Admiral Souers: The Civil Air what?

Al Willman: The Civil Air Patrol. They are the real "Minute Men" of this war and are doing a swell job using their little civilian ships to patrol our coastlines. Don't tell me you haven't heard of the CAP!

Admiral Souers: Has that anything to do with the CPT?

Col. Roseybelt: No, sir, you have it confused, sir. It's in the OCD. My mother . . .

Admiral Souers (interrupting): Small planes, eh? If small planes were the answer to the sub menace the Navy would be building small planes. Remember, in modern warfare, you get just what you pay for.

Mr. Willman: The Navy got a lot they didn't pay for. But they're paying now—through the nose. And so long as you keep airplanes as an auxiliary to the fleet you will continue to pay! Mr. Bleat here can tell you how many years he tried to get the Navy airminded!

Mr. Bleat: That's right, Willman. Nothing less than right is right. And, brother, did I get grey headed!

Admiral Souers: Bleat, you used the wrong approach. You, like Willman over here, and General Billy Mitchell, never used tact. Let us not cry over spilt milk, but it is to be regretted that so many of our pioneer aviation ambassadors were not men of patience and even tempers. The irascible natures of air power proponents has done more to cripple aviation progress in America than any other one factor. Too bad more of your breed could not have had the benefit of Annapolis training. Then it would have been a simple matter to sell the Navy your wares. We've had the same thing in the Navy. Look at Rosydell, the lighter-than-air expert. We sent him back to sea last month. His lighter-than-air stuff was good but his approach was all wrong.

Mr. Liftorsky: Let us not deal in personalities, gentlemen. Let us keep to the scientific bent. Have you men ever considered the full significance of my helicopter experiments? I have brought with me today . . .

Mr. Zipp: By George, that is one thing I forgot to put in my book! Maybe I can catch the second edition before it's too late. Excuse me, gentlemen! (Exit Zipp).

(Enter Colonel Julep)

Col. Julep: Pardon the interruption, but the War Contracts Division advised me just a few minutes ago that a contract totalling eleven billion dollars has just been awarded to Mr. Liftorsky for an unannounced number of helicopters! Gentlemen, that's news!

At this point everyone jumped up and rushed Mr. Liftorsky, proffering vigorous congratulations. The whole thing being so incoherent, I figured it was a good break in the experts' deliberations and took my leave.

Walking back to my tourist camp across the Potomac, I reflected soberly on the strange things I had just heard and witnessed. I came to the conclusion that what this country needs is not so much control of inflation or price ceilings on nutmeg, fishing minnows and re-capped casings, but rather a National Committee for the Co-ordination of Expert Opinions. In my humble opinion this would do more than any other one factor to relieve public confusion, solidify the nation and deliver us from the epidemic of insomnia that's sweeping the nation and its resultant jeopardy of national health by the alarmingly increased number of stomach ulcers. If you agree, the author will welcome correspondence on the subject and perhaps we can institute a national movement.

COMMON-SENSE PLANNING FOR POST-WAR AVIATION

Streamlined Rules FOR CIVIL FLYING

By CHARLES I. STANTON
U. S. Administrator of Civil Aeronautics

THE Civil Air Regulations are being streamlined to speed war and post-war civilian flying. Although he is now burdened with new regulations made necessary by war-time conditions, the private pilot, along with other airmen, can take consolation in the fact that recent progress toward simplification of the CAR will save many hours of time formerly spent doing business with Civil Aeronautics Administration inspectors. Members of the Civil Aeronautics Board have shown that they are anxious to continue this process and the CAA plans to put before them as rapidly as possible further suggestions for simplifying the regulations.

Streamlining the rules has in no way imperiled the reputation of the U. S. civil aviation for being the safest and most efficient in the world today. By and large, airmen recognize and accept their responsibilities, and need only a minimum set of common-sense regulations as guideposts.

Certificates Made Permanent

With this in mind, the CAA, which is charged with enforcing the regulations, had begun work before Pearl Harbor on a series of proposals for simplification. A number of these have already been adopted by the Civil Aeronautics Board, which is charged by law with drawing up the regulations CAA enforces, and which, appropriately, looks to those who deal with enforcement of the regulations for suggestions as to their improvement.

The Board sits in judgment on what has become the nation's third greatest industry, and is anxious to keeps its regulations as streamlined as the airplane itself.

Probably the outstanding recent change is the establishment of permanent airmen certificates, eliminating the requirement of periodic endorsement by CAA inspectors. Heretofore, every pilot, mechanic, dispatcher, control tower operator, and instructor had to find out annually when a CAA inspector would be in the vicinity, perhaps make a trip to another town to see him, possibly find that the inspector had been delayed by a heavy schedule, come back the next day, wait his turn, and at long last get a chance to show the inspector his log book and prove that he had had the necessary amount of appropriate experience during the preceding twelve months.

The actual endorsement procedure would take ten to thiry minutes, but might involve as much as two days of the individual airman's time. From the inspectors' point of view, this task, which averaged fifteen minutes, was

(Continued on page 39)

SUCCESSFUL PICK-UP FOR GLIDERS was almost routine for All American Aviation, Inc. President Richard C. duPont, with his veteran pick-up mail pilots and his own experience, recently demonstrated their skill at picking up a Cub. Then a glider was tried. What happened is pictured above. At left an All American Stinson hooks onto the towline as if it were a sack of mail. The line (center) quickly was made fast while the glider raced into action (right) and quickly became air-borne. Note its altitude even before it passed the ground station poles.

Saved by the Army Transport Command from extinction, our domestic airlines are serving world-wide fronts. American and TWA each will soon make twenty-four daily trips to England. Braniff is flying in Central America, United will span the Pacific. They're on their way to war, with an air empire as a peacetime goal.

GLOBAL AIRLINES

For Victory

By
ESTHER H. FORBES

AFTER months of uncertainty our commercial airlines at last have a clear picture of their status in this war. They will not be taken over by the government. They will not be made to decrease their operations. On the contrary, they will fly more miles than ever before in their history and open new routes to foreign countries, laying the foundations for a post-war international network. At the request of Brigadier General Harold L. George, commanding officer of the Army Air Transport Command, they have undertaken all the aerial transportation of men and material for the Army.

The Air Transport Command was established in June to replace the disbanded Air Corps Ferrying Command and Air Transport Service. Civilian pilots had been employed by the Ferrying Command to fly Army planes from the manufacturers to airports here and abroad, and General George decided to continue this policy. Army pilots, however, had flown the transport planes carrying military personnel and cargo. General George wanted to release these pilots for combat duty. At the same time he realized that he would have to increase our air transportation of cargo many times in order to get essential supplies to the front lines.

Free Enterprise Reaffirmed

Already organized were seventeen commercial airlines, which had proven their efficiency during years of peacetime experience and in the first months of the war. On July 20 General George called together the executives of nine of these airlines and asked them to take over world-wide air transportation for the Army. The airlines volunteered their services immediately and started schedules before any arrangements for compensation had been made. In August the remaining eight airlines were brought into the program.

General George has made it clear that the airlines' operations for the Army will not take the place of their commercial flights, but will be in addition to them. The airlines' tasks are really threefold: to provide quick transportation facilities for civilian war workers, to operate domestic routes for the Army, and to establish foreign routes over which to carry military personnel and equipment.

The enlistment of the airlines' services has far-reaching implications both for the airlines and for the country. It emphasizes the principle of free enterprise. It symbolizes the co-operation between industry and the military. Finally, it paves the way for America to link the nations of the world to each other by air after the war.

This country has always believed that men work best under the initiative of the profits system. If we are to prove ourselves right, we must overcome the Axis powers with the weapons of private industry. For a while, however, it looked as though the Administration might make the tremendous mistake of adopting totalitarian methods in this country. The airlines felt the sting of this threat a year ago in March. Foreseeing an increased demand for air travel as war came closer and closer to our shores, five of the big airlines had chipped in and asked Douglas Aircraft to make them a plane twice as large as the DC-3. The DC-4 was the result. The airlines were so well pleased with it that they ordered sixty. Whereupon the government arbitrarily made them cancel the order.

Continuing this shortsighted policy of restricting the development of commercial airlines, the government as late as May, 1941, refused to give American Export Airlines a mail contract from New York to Lisbon. Meanwhile, President Roosevelt was taking twenty-four DC-3s from the airlines for delivery to the British. The actual decrease in their planes did not present much of a problem to the airlines. By keeping each plane in the air more hours a day they were able to meet their schedules. It was the uncertainty as to what would come next that was the real worry.

With the outbreak of war the outlook was even darker. Night flying was immediately grounded on the West Coast. Then, on December 13, the President authorized both the Secretary of Commerce and the Secretary of War to take possession of civil aviation to the extent they deemed necessary. Here was the germ from which could grow government operation of the airlines.

The Army and Navy, however, sought not management of the airlines, but co-operation with them. They had already issued a joint statement that "the air transport industry is a necessary adjunct to the national defense." In recognition of this the War Department established a system of priorities on airline seats in February. Two months later the airlines, anxious to collaborate in every possible way, offered some eighty-five of their planes to the Army for its Air Transportation Service. The sacrifice was real, for these were new planes in good condition.

General George's request that the airlines take over the Army's air transportation came, then, as the climax to long co-operation between the Army and the private airlines. It means that the airlines will continue to operate under their own management. The amazing rapidity and efficiency with which the airlines have established regular flights for the Army while maintaining a large number of their commercial routes justifies American faith in free enterprise.

All-Out for Air Transport

The miracle of transportation which our airlines are performing has not caught the public's eye as has the manufacturers' miracle of production because an air trip is not tangible like a finished plane. Yet it is none the less marvelous. On the home front the airlines are serving all the important industrial cities, though their fleet of commercial planes has been greatly depleted. They prevent bottlenecks in defense plants by rushing missing parts across the continent. They speed Army officers from post to post. On foreign routes they carry new engines, propellers, smaller replacement parts, guns, bombs and medical supplies to our fighting forces. They fly technicians to adjust mechanical equipment which has given trouble in combat. They transport fresh troops to our battle lines and take wounded soldiers to hospitals where they can receive adequate care. Wherever there is a job to be done quickly, they do it.

The airlines have been given back the planes which they turned over to the ATS this spring and are operating them, along with others once used on commercial runs, for the Army in Army paint. Every month they are increasing this fleet with planes just off the assembly lines. The planes now in use fall into three general types. Land planes, originally designed as transport or cargo planes, include the Curtiss Commando, the Douglas C-47 and C-54 (DC-3 and DC-4), the Boeing Stratoliner, the Beechcraft 18A, the Lockheed Lodestar and the Boeing 247D, the last two used for rush freight orders because of their high speeds.

Scores of New Foreign Routes

Our four-engined bombers, the Liberator and the Flying Fortress, can easily be converted to cargo carriers. Both have already performed many important transoceanic missions for airline pilots over routes established by the ATC. Now Consolidated's Texas plant is turning out a transport version of the B-24 on the longest mechanized assembly line in the world.

Flying boats under the jurisdiction of the Navy are also at work for the Army. Pan American's Boeing Clippers and American Export's Vought-Sikorsky Flying Aces are carrying personnel and cargo according to government priorities. In addition, Clippers are transporting Army troops to many parts of the world. To meet the transport needs of the Navy, Nash-Kelvinator is producing a cargo version of the Flying Ace in one of their Southern plants.

The commission to operate international routes promises a bright future for the airlines. They have quickly set to work building bases in all parts of the world, which will be ready for commercial traffic after the war. In the past years Pan American has pioneered routes across the Atlantic and Pacific and has set up bases on every continent. Today it is multiplying these bases. Not only is it carving airports out of African jungles and deserts, but it is providing for the health of all its men on construction and maintenance jobs. What Pan American has already accomplished is only a sample of what all the airlines together are doing and will do.

Still in the first stages of the transport program, the airlines are now operating scores of new routes to foreign countries, with hundreds of flights scheduled daily. When they get into full swing, American Airlines and TWA will each be making twenty-four trips a day to the British Isles. Other assignments are: Northeast Airlines over the North Atlantic, Northwest and Pan American to Alaska, Western to Canada, Braniff to Central America, Eastern over the Caribbean into South America, and United across the Pacific. In addition to continuing its West Coast-Hawaii service, Pan American is covering the Caribbean and South Atlantic to Africa and on eastward.

Via these routes airline pilots are making daily deliveries behind our front lines. If the battle areas change, the routes will change, but the deliveries will go on in ever-increasing numbers until victory. Then, after the war, our private airlines will be equipped to give immediate air service to any nation. They will have the airports. They will have the pilots. They will have the planes. Other countries, ravaged by war, in need of air travel but unable to provide it themselves, will welcome them. U. S. airlines will thus gain leadership of the air lanes of the world. And this air supremacy they will use to sow the seeds not of discord but of unity.

Volunteer Soldiers Aid High Altitude Research Program

Scientifically trained personnel of the Army's Aero Medical Unit at Wright Field, Ohio, with enlisted men as the objects of their experiments, have found ways and means of protecting the health and life of United States Army pilots who fly miles above the earth. According to Army Aero Medical authorities, no American pilot should suffer serious ill effects from high altitude flying so long as he carefully follows the instructions given him by the Flight Surgeons.

As planes are built to go higher, volunteer medical soldiers and officers enter a steel pressure chamber and endure the simulated conditions of the high altitudes and thus bear the brunt of the physical discomforts that an unknown altitude invariably presents. Like blocking backs on football teams, they break holes in the altitude through which combat personnel will smash their way to victory.

The first soldier volunteer medical subject received the Distinguished Flying Cross in September, 1940, for his work as an experimental subject in carrying out medical research studies for high altitude flight involving a degree of personal risk well beyond normal call of duty.

Although it is conceded that medical soldiers assisting in the high altitude research face danger, the officers of the Aero Medical Unit are proud of the fact that no permanent injury has ever resulted from this work. Operators of the altitude chambers have

RIDING ERGOMETER AT 35,000 FEET. GADGET ON EAR TABS OXYGEN SATURATION IN BLOOD

ARTERIAL PUNCTURE AT 40,000 FEET (note altimeter) furnishes sample of blood to study effects of altitude. Major David B. Dill (right), well-known Harvard high altitude scientist, takes the sample inside a pressure chamber.

"I JOINED THE NAVY AND LEARNED HO

By LT. ROBERT F. DAVIS, USNR

THIS should be a letter to just one of my friends and I should write an individual one to each different friend, but it's really too much to ask of one who must arise at 5 a. m. on every morning except Sunday (and sometimes, so I have been given to understand, even on Sunday).

Two weeks ago this morning, after a twenty-hour drive, I arrived at this hotel at 4:30 in the morning only to find it too full to accommodate me. The San Carlos being the only sizeable hotel in Pensacola, I had to spend the remainder of the night at a tourist camp but did manage to get a room at the San Carlos the next day and have been here ever since.

What the Place Looks Like

Suspecting that the "Annapolis of the Air" might expect one to be more formal than is required in Washington, D. C., I put on my whites for the first time in my three months in the Navy. Sure enough, everybody else was in whites, with the exception of a Lieutenant Commander from Washington that I chanced to meet in the coffee shop, and who did not have his whites available. Incidentally, the Shore Patrol called him on this, the first evening he was here and he immediately bought himself another set of whites. They really mean this place to be the "Annapolis of the Air." You wear khaki in the daytime but not after six o'clock or on Sunday.

Reporting aboard Monday morning (that means to the Naval Air Station) I was given a check-in card, a set of instructions, and a map. I had to see about everybody in the station, have them sign the card and return it to the training office. By the time I had done this, I had become a member of the Officers Club, drawn my flight equipment, gotten a Naval Air Station tag for my car and acquired a new pass to the station. My Navy Department pass from Washington was apparently no good down here.

I managed to come ashore early the first two or three days with the Lieutenant Commander and explored the town and beaches. There is a beautiful beach called Gulf Beach, but not much else, about fifteen miles west and another beautiful beach with somewhat more in the way of recreational facilities, called Pensacola Beach, across a long bridge to the east. There is also a nice beach and a beautiful club house for officers on the station, but this is

complete control of the situation, and when the going appears to be difficult for a soldier in the chamber, he is returned to ground conditions at once.

The soldiers of the Medical Detachment are chosen from the ranks on the basis of their courage, physical fitness, and special training. All men of the detachment are volunteers. A special course is given to prepare them for their rigorous life. A soldier who shows fear and lack of interest in his work is transferred to some other unit immediately, although this has not been necessary very often.

Even with the danger-to-life factor well under control, the soldiers of this Medical Detachment frequently face pain and discomfort, far in excess of that known by the average soldier. Most of them, for example, are subject to arterial punctures—the process by which a doctor takes sample of blood from an artery. According to Lt. Col. Otis O. Benson, Chief of the Aero Medical Unit, this is a rather painful process. Commenting on arterial punctures, Lt. Col. Benson said, "It's a painful procedure, yet the men volunteer for it without comment. One soldier recently had ten of these punctures made in his arm in the same day. That in any man's language is 'taking it'!"

MEDICAL CLASS FOR SOLDIERS gives Wright Field unit thorough training in first aid. Although the detachment's main work is assisting in medical research, the soldiers are also drilled in combat work.

O FLY ALL OVER AGAIN"

on the bay. The town of Pensacola is just a small southern town made up mostly of uniform shops, two or three movie houses and a few, not-too-good restaurants.

There is, of course, a large airport at the Naval base and there are several other large airbases scattered around within a radius of some fifteen or twenty miles. Each of these has beautiful hangar facilities, an administration building, shops, mess facilities, radio practice rooms, gymnasiums, tennis courts, shooting ranges, swimming pools and so on. Each one also has its quota of practice landing fields in its vicinity.

Deep Water Double Talk

On Wednesday, I got started at one of these fields, reporting in the morning at 0615 (6:15 a. m. to the landlubbers), which means getting up at 5 a. m. Ordinarily we would be there until 1640 (4:40 p. m.) but for the first two weeks we were given the afternoon off to attend an indoctrination class at the main station. In this class we were told, in as much detail as possible in two weeks, what is expected of a Naval officer, and given a new language so that we can talk as though we had lived all our lives on shipboard. The fourth floor of the hotel is actually, of course, the fourth deck, surrounded by bulkheads instead of walls and covered by the overhead instead of a ceiling. Incidentally, I usually go down the ladders in the morning instead of what I thought was walking down the stairs. Just so I won't be sued for defaming the famous San Carlos Hotel, it does have elevators, and the service is all right even at five in the morning. There is also one restaurant open in Pensacola at 5 a. m. and it usually has a crowd.

By daylight we are on our way to the airport. I have been the Senior Officer of our group since I've been here, so I line the group up and call the roll (muster the men). From then on we watch the flight boards, lounge or study in the ready room, attend gym or go to the radio code room.

The first order of business is, of course, to watch the flight schedule which is posted on two large blackboards, because, our first object in life is to learn to fly all over again. After a couple of lessons in an N3N-3, a two-place yellow biplane powered by a 225 h.p. radial engine, and commonly known as a "yellow peril," they let me loose by myself. In the meantime, they had made me memorize all the course rules, landing and taxiing procedures, how to inspect an airplane, the course and landing procedures to follow at each of the outlying fields, when to come home and land, what to do in case of an injury to the landing gear in take-off, and a million other things. I am all in favor of the Navy way of flying and just about thoroughly convinced that I knew nothing about flying when I came here (and don't yet).

Meet the "Yellow Peril"

I don't think I will ever forget the first landing I made in an N3N. I coasted gently into the field at between sixty and sixty-five knots, came on down until my wheels almost touched the ground and pulled back rather heavily on the stick thinking I had a rather heavy airplane under me that would settle right out and leave me on the ground. But it did nothing of the kind. It soared right off to a height of about twenty feet from which, with the aid of the throttle, I had to mush it back into the field. As a result, I have concluded that all airplanes painted yellow fly like Cubs.

(Continued on page 30)

THE *Sky's the Limit*

BY BILL GREEN

How the draft hinders the war effort . . . The Army gets its man and still loses . . . There are not enough experts . . . Let's make it work fairly . . . Lessons in airplane design.

SOMETHING is rotten, not only in Denmark, but also around here. We don't see how the war can be won with the tactics we are pursuing on the home front. Specifically we are now worried about the way mechanics, pilots, executives, and other specialists are being drafted without regard to the value of the work they are doing for national defense.

We have particularly in mind a large airplane service corporation which was organized some eight years ago. This company has tried one man after another in an attempt to find an executive capable of getting the job done. Some of the executives left because they couldn't seem to get along under the conditions imposed. Some of them are successful in their own businesses—organized since then—and some are doing important work in the war effort now. Suffice it to say, however, that the owners of the plant didn't find, until recently, a set of executives who were able to get the job done—and were at the same time satisfactory to the stockholders. Now they have such executives—they have large government contracts — and various airplane companies, government-operated flying schools, etc., are trying to give them a lot more work, which they can't begin to handle. Success all over the place. But what happens? The draft board advises the general manager to get ready — his number is up.

We understand that draft boards, and the selective service in general, believe that just anyone can be trained in about one week to become a plant executive. At any rate, away they go drafting these executives, while at the same time the Air Corps, government et al, are hollering for more production.

Another example is that last week the draft got a mechanic out of a plant doing nothing except AAA work. They also took two men from a company supplying electrical parts for A-1-A Army work. There apparently is little or no regard for what the people are doing. What will these guys do when they are in the Army? Have you followed the careers of some of them? Well, it has happened in numerous instances that the draft gets a man doing very important civilian work, for the Army, and then puts him in the Army—many times studying something or other entirely foreign to what he was doing. And a man can stay in Army schools until the end of the war. It was done in the last war, and will be done this time, and we lose the value of the work for which the man was originally trained —and which he could do—and which above all—we urgently need to have done. It burns us up.

Another example: Draft boards all over the country are refusing to defer farm and dairy hands. They say that women, or old men, or boys can do the job. And yet they must have *more* food, *more* milk, and *more* of everything. Well, we have been in the dairy business off and on for a good many years, and we are running a pretty nice grade A raw milk dairy farm right this minute. We have about eighty first class registered Jersey cows. We've taken some of these cows around the country and have won a lot of blue ribbons at some of the fairs. Every one is worth from one to four hundred dollars, and some of them a little more than that. Every cattleman has found that the knowledge of what to do with and about cows is something that you learn throughout a lifetime of effort, study, and experience, and there is no substitute for such knowledge. For years we have sometimes been pretty exasperated with our own dairy hands, but we could not do without them. If they are drafted, and we can't get some others somewhere, we will have to sell the cows for beef—and a Jersey isn't worth much that way. Otherwise the cows would eat more than they would produce—and they would die.

Quota System Unbalanced

Of course, one can always find more personnel—or can one? There have never been *enough* experts in any line of business. If you think there are, just ask any plant manager, or any resident Army Air Forces inspector, or representative. There aren't any. Still, we are going to have to get four and a half million more people out of this country—and that may mean a lot of plant managers (what are they good for anyway?) and a lot of dairy hands (serves them right anyway, for wanting more money, because now they'll get a lot less) and a lot of other people who are keeping the things alive that we are supposed to be fighting for. If we come back to a world in which all the good things are wiped out and destroyed—wotinel are we fighting for?

Well, anyway, we have thought this thing out a little—and while we are usually wrong on such things it looks to us like there are several obvious truths to be considered:

1. The draft boards are pretty nice people, as a whole, and they are contributing their time and efforts and are trying to do a good job.

2. We do need a lot of people in the Army, but we also have got to have a lot of equipment with which they can work.

3. A lot of home fires absolutely have to be kept burning, or we will not have any incentive to fight. Believe it or not, the incentive does have to be kept in front of them. When Washington's men heard that their families were starving and cold back home, and when the kaiser's men heard the same about their folks at home—the men deserted or revolted in large numbers and the war almost collapsed. The same thing happened

in sporadic instances during the Civil War—on both sides.

4. A strong co-ordination of the whole business *must* be worked out. Apparently one trouble lies in the fact that local draft boards are allotted so many men per month—and they have to furnish that many men. This results in some of the smaller boards having to send every man they can lay hands on—while some of the larger boards can defer practically anyone they wish to.

Especially, now that older men are being drafted, many injustices, or at least, somewhat injudicious disconnections, are being made.

Couldn't we have a little more consideration of the problem—by Congress, the President, the Chief of the Selective Service—or someone powerful enough and capable enough to make a reasonable and practicable arrangement that will (1) get the jobs done at home, (2) get the equipment built, and (3) build the Army we need? We certainly hope so. Won't you use your influence to get the matter considered?

Design of a Private Airplane

Recently we had the best opportunity we have ever seen to evaluate the design principles of many private flyer-type airplanes. Nearly all of them have three to six main disadvantages—for *any* kind of work—and all of them have numerous failings—for the particular work we have been doing.

These imperfections could probably be summed up about as follows:

First, most all airplanes have very poor visibility when taxiing—and this results in *impaired* visibility in the air. You never realize what poor visibility you do have until you try to make detailed observations from your ship—or make forced landings in unknown fields—or on a beach strewn with logs, etc. In general, high-wing monoplanes are best for watching things on the water or ground. Biplanes are bad—but low-wing monoplanes are probably the worst.

Second, most airplanes are very lightly constructed, and will not stand up under prolonged usage without continuous replacement or patching of wings, fabric, brakes, wiring, cowling, magneto points, spark plugs, etc. (We have had occasion to employ some airline mechanics who worked on the run-of-the-mine private ships. They are unanimous in that valves, magnetos, spark plugs, etc. on private ships require three to six times the servicing required by airline type airplanes.

Third, source of supplies for the private ships has never been good—and now it is terrible.

Perhaps there has been a lot of indecision on the part of leading aircraft manufacturers in adopting one set type of design for aircraft for private use. There is no telling exactly why this has been—probably because they have been too busy trying to bring out something "different." Most everyone knows that the most stable small ships are high-wing monoplanes. These have the best visibility, both on the ground and in the air. They are the simplest to construct—from lots of different angles. Gasoline will flow by gravity—center of gravity is low—the wings are not always hitting low objects on the ground, etc.

Simplicity Means Satisfaction

Low-wing ships permit simpler retracting landing gears—and a little more speed per horsepower. However, they have lousy visibility, one is always knocking holes in the bottom of the wing—especially when in poor fields, and the stability is usually poor. Average dry land private pilots don't need a retracting gear—it adds a few miles per hour to speed and takes a few years off your life—if it fails to come down, which is at least once to every airplane if you wait long enough.

Most airplanes are too complicated. We have all kinds of them—and can say that the airplanes that fly the most with the least comparative troubles are the small simple ones. The minute you stick on generators, heaters, radios, landing lights, retracting landing gears, windows that raise and lower, many instruments, etc. you are really in trouble. With our flock of airplanes of various types, we have found that on complicated airplanes the other things considered necessary cause more trouble than the engine and airplane—on simple airplanes the engine causes most of the trouble. If the engineers could get this picture well in mind, and could do some real design work, many of these difficulties could be eliminated.

We would like to point out one excellent design job that is in general evidence of how several birds may be killed with one stone. The Franklin engine people, in designing the ninety h.p. Franklin, designed the carburetor and manifold system so that it goes through the oil reservoir — which is normally pretty hot — thereby achieving an automatic hot spot for the carburetor. It seldom ices up. At the same time, the evaporation of the gasoline, with its consequent refrigeration effect, adequately cools the oil without the necessity of any oil radiator, except a little air on the oil case. This results in considerable saving in weight, expense, and possible trouble with an outside oil radiator as used in many airplanes. No outside oil connections, tubes, hoses, etc.

Control mechanisms could stand a lot of improvement and simplification. We believe that most of the trouble comes from trying to use a lot of stuff that somebody already has built and lying around. On the other hand, those manufacturers who have stepped out and designed a special push-pull tube arrangement and linkages for the control surfaces, have usually achieved much better simplicity—more rigidity and dependability, and probably did it with less time, money and material. Anyway, we like that sort of system. No cables to come out of the pulleys, rust, fray, cut through the tubes integral to the airplane.

We like cantilever airplanes better than braced wing jobs on account of the simplicity and the fact that they are just naturally cleaner and faster. However, although there are a lot of such jobs on the market—or were—they can all stand a lot of improvement that would produce obvious advantages.

We are sorry the war came along just at this time. We know that a number of airplane designers had in mind bringing out vastly improved aerodynamic designs—and perhaps a lot of simplicity in internal construction. However, some of this design work is progressing nicely, and there are already several new engines that will be available for the medium priced airplane as soon as the war is over. We also hear of new airplanes notably plastic or plywood models, that may become available.

Undoubtedly there will be a million or more prospective airplane purchasers when this thing is over. But manufacturers must keep in mind that, although many of them can fly anything with an engine in it, their incomes will be limited. They can't afford a high first cost, or a high operation cost, or a high maintenance cost. Sharpen your pencils, boys and get to work!

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Ryan Gets Navy Order

Contracts have been signed by the Ryan Aeronautical Company of San Diego for quantity production of SOR-1 scout observation planes developed by the Curtiss-Wright Corporation for the fleet as long-range scouting. Details were not given.

Army-Navy E *for* TEXAS

By JIM CHAMBERS

Dutch Kindelberger has been proud of his Texans ever since they broke all records building their big factory in a muddy cotton patch. Now he's happier than ever, for the two-year-old North American AT-6 factory has won the "E". It just goes to show what the South can do when cotton pickin's done and a war's to be won.

TWO years ago the blazing Texas sun beat down upon a cotton field near Dallas where raw farm hands gathered the white gold from the verdant foliage, their pace slow, in keeping with the lazy, mañana spirit of the South at peace. In less than twenty-four months the Texas plant of North American Aviation, Inc., has sprung from that cotton field, gone into production and won the highest award that the United States Government can give for excellent production of war materiel—the coveted Army-Navy E.

And just as the raw cotton lands were converted into the nation's most modern aircraft factory during that period, so were raw Texas workers who had never even seen a big factory, much less worked in one, turned into efficient, fast and skillful workers, workers whose production record has won them the right to proudly display individual distinguished service awards.

Success from Ground Up

It was in the early summer of 1940 that the board of directors of North American Aviation, Inc., at Inglewood, California, authorized the erection of a new plant and the creation of a new division. Immediately several locations were inspected and it was finally decided that Texas was the best site because it was in the midwestern safety zone, offered a fine supply of labor, central location, good flying conditions, freight facilities and workers who were famous for their ability to get a job done. J. H. Kindelberger, president of North American, came to Texas with J. L. Atwood, executive vice president, inspected the proposed site and gave the final "okay" that set the fast-moving machinery going.

The officials flew back to California. Numerous conferences were started. The officials wanted this to be one of the most modern aircraft plants in the nation and they incorporated in the plans all of the "know how" they had learned throughout the years. Their notes on "blackout, no windows, air-conditioned throughout; direction flow of production; conveyor systems" were translated into blueprints and the blueprints, in record-breaking time, became webs of steel, masses of concrete and miles of intricate conveyor lines, machinery and tools.

On September 28, 1940, Mr. Kindelberger returned to Texas again, to officiate at the ground-breaking ceremony at the plant site.

On November 6 the general contract for the plant was awarded.

Realizing the necessity for super-human speed on the project as war clouds became darker, the contractor immediately assembled his force and on November 16 the first concrete was poured.

Then the rains came, discouraging, cloudburst-like winter rains that turned the plant site into a quagmire. But the contractor had orders not to stop for anything so he issued boots and raincoats and ordered work continued. Trucks hauling material were literally lifted from the road to warehouses by huge cranes, carpenters worked knee-deep in mud, plumbers and electricians did their preliminary work in shacks set up on the grounds.

PROUD OFFICIALS display North American's "E" in Texas. Left to right are Brig. Gen. Arthur Vanaman, commanding general of the Air Corps Materiel Center at Wright Field, Ohio; Maj. Gen. Barton K. Yount, commanding general of the AAF Flying Training Command; Factory Manager H. F. Schwedes; President J. H. Kindelberger; Capt. Alfred E. Montgomery, commander of the Corpus Christi Naval Air Station, and Commander A. Laverents, commander of the Hensley Field Naval Base.

Production Tripled in Three Months

Despite all these handicaps the first steel went into place on December 2, 1940. Three months later, on March 8, 1941, first manufacturing operations began. Certain areas of the factory had been completed to the point where they could be occupied and departments moved in while construction went on about them. It rapidly became one of the Nation's largest aircraft factories.

The first three planes rolled off the assembly lines, and were delivered to the Air Corps on the day the plant was dedicated, April 7, 1941—only a half year after the first pick was sunk into the farm lands.

As employes were recruited—only the nucleus of an organization was sent to Texas from Inglewood to train the new but enthusiastic employes—the tempo of the machines picked up and three months after dedication the plant had produced three times as many planes as the schedule called for.

People from all walks of life, cowboys, farmers, automobile mechanics, school teachers, housewives, filling station operators—people who knew nothing at all of airplanes or industrial processes — were attracted to North American to do their part for their country. People who didn't know one end of a lathe from the other won for themselves and the plant the coveted Army-Navy E.

Work Simplification Pays Off

Reason for this lies in North American's production methods. It wasn't so long ago that each plane was pretty much of a custom-built job. The ships were built by a small group of workmen who were skilled in every operation pertaining to construction of a plane and they literally built the ships by hand. Today, however, each phase of production has been broken down in such a manner under a work simplification plan that unskilled workers can learn simple operations and do them well. These operations are then blended together into a large part for the plane.

As an example, in the old days three or four men would build an outer wing panel for a plane. They fashioned all of the parts and then assembled them. Today, however, many men and women work on different phases of the wing panel and it is gradually built up as it moves from department to department. This speeds production and also allows unskilled workers to be enlisted in the production program.

This helps to explain the "miracle" of production accomplished by North American. But coupled with it is the willingness of Texans to grab hold of a strange job and do it well. And that great urge to do something for our country, which fills every man and woman at North American, has a lot to do with it also.

Capstone of the North American production methods in Texas came in April, 1942, when one of the most complete conveyor systems ever installed in an airplane plant was placed into operation in the Texas plant. It places the entire plant on a basis which is considered tops in efficiency. Parts and planes move from station to station on endless, beltlike chains.

AT-6 Becomes "Universal" Plane

The Texas plant manufactures what is believed to be one of the world's most universal airplanes. It turns out the AT-6 for the U. S. Army Air Forces, the SNJ for the Navy, the Harvard for the British and has filled orders for Mexico and seven South American countries. All of these planes are of the combat-trainer type and are used exclusively as trainers by the United States and Great Britain. Mexico and South America, however, use the planes for coastal patrol and scouting assignments.

Effectiveness of the AT-6 as a coastal patrol plane is seen in a report from Mexico which announces that on July 5 a pilot in an AT-6 sighted and bombed an enemy submarine off the coast of Tampico.

The North American combat trainer is powered by a Pratt and Whitney motor, has dual controls, two-way radio, retractable landing gear and is equipped with bomb racks and machine guns. It is noted for its maneuverability. Pilots declare the AT-6 can really "take it."

The Texas-made trainers are in service daily from Canada's sub-arctic circle to the airdromes of Rhodesia and South America, from the British Isles to Australia. The Army Air Forces Flying Training Command recently announced that student pilots at Craig Field, Alabama, had flown over 23,000,000 miles in North American's AT-6's without a single mishap due to mechanical failure. This record brought a telegram from Lieut. Gen. H. H. Arnold, chief of the U. S. Army Air Forces, congratulating the Texas employes of North American on "this impressive evidence of the skillful and conscientious workmanship you are putting into these advanced training planes."

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STREAMLINED RULES

(Continued frome page 21)

multiplied more than 80,000 times per year. In other words, more than 20,000 man-hours were spent annually in what seems to be an unnecessary task.

A series of amendments to the Civil Air Regulations, prepared by the Civil Aeronautics Administration and approved by the Civil Aeronautics Board during the first half of 1942, have made all certificates of indefinite duration, requiring only a periodic physical examination. The responsibilty for keeping his experience current is placed upon the individual airman.

Common-Sense Relaxation

A separate medical certificate necessarily followed, and it was provided that this could be obtained within twelve calendar months preceding any flights, rather than within the limited period formerly determined by the expiration date of the airman certificate. Physical standards, formerly scattered through the regulations in nine parts dealing with various types of certificates, were brought together on May 22, 1942, in a new Part 29, and grouped in three classes.

Under this arrangement, a person passing the third-class examination, for example, would be considered physically qualified either as a student pilot or a private pilot, without any necessity for going back to the same doctor and repeating virtually the same examination. With some 100,000 persons taking student pilot examinations a year, and 30,000 of these applying soon after for private pilot certificates, substantial savings of time and expense were made possible.

The same revision of medical regulations provides that "an airman certificate may be issued to an applicant, if in the opinion of the Administrator his aeronautical experience, ability and judgment compensate for his physical deficiency."

Previously, such a waiver had been permitted only for persons who had already qualified for a given type of certificate and whose physical condition in the course of time fell below the minimum for that grade. Until this change was made, a man who had piled up hundreds of hours and whose vision was satisfactory with glasses, poorer than 20/50 without, could never have obtained a commercial certificate. This common-sense relaxation is enabling hundreds of able pilots to qualify as instructors and serve in the war effort.

Periodic endorsement of aircraft airworthiness certificates has also been suspended for the duration. CAA had been conducting over 38,000 inspections of aircraft annually, each consuming approximately two hours. It is believed that under the new system the number of inspections will be cut in half.

More Streamlining Coming

An earlier step toward placing increased responsibility on the industry was taken in June, 1941, when regulations were amended to permit approved repair stations to clear aircraft for flight after major repairs. Previously, a check by a CAA inspector had been required. Often this meant the ship would be grounded until such time as the inspector's schedule brought him to the place in question. The amendment recognized that when the CAA approved the personnel and equipment of a repair station, it was logical to rely on the quality of its work.

In addition to changes in regulations, there have been several new administrative procedures adopted to speed up service and eliminate red tape. One was the appointment of flight examiners, who now number over 600. These are qualified, reliable men in the industry authorized to give tests for pilot certificates to the thousands of applicants created as a result of the CAA pilot training program.

Another was the use of multiple-choice tests on theoretical material, which are sent to Washington to be graded immediately by machine. The applicant is thus assured of a prompt and impartial decision.

At the same time, applicants have been permitted to take their theoretical examination at any time, instead of being required to wait until they are eligible on the practical side.

A comprehensive shakedown of regulations must wait until the pressure of war tasks is lifted, but the men who write and the men who enforce the rules are agreed that when civil flying comes back into its own, it must not be hampered by an overwhelming mass of regulatory verbiage. To promote the growth of flying, they are determined to cut down the rule book to an absolute minimum.

The CAA is doing spade work toward this end, and with assurances of hearty co-operation of the members of the Civil Aeronautics Board.

★ ABILITY

★ PRECISION

★ PRODUCTION

DOLAN AIRCRAFT MANUFACTURING COMPANY

DALLAS, TEXAS

Removing Broken Drills

By **HENRY J. BURNETT**
Production Engineering Department
Assisted by
CHARLES E. HANSLING
Salvage Department
Pratt & Whitney Aircraft Division of
United Aircraft Corporation

ONE of the most perplexing problems in modern manufacturing—the removal of broken drills, reamers, and plug gages from drilled holes—has been solved at the Pratt & Whitney Aircraft Division of United Aircraft Corporation at East Hartford, Connecticut.

The Production Engineering Department developed a method of making an electric arc butt-weld between a stainless steel welding rod and the broken part, and then extracting the broken part by tapping upward on a lathe dog or clamp on the welding rod. This has replaced the methods formerly used of trying to drive or break out the broken part, piece by piece, with a prick punch and hammer. Those methods were seldom successful and frequently resulted in burred surfaces or other forms of distortion and eventual scrapping of the part.

Under the new method of removal, not only are more parts being saved from the scrap pile but the time required for the salvage operation is being constantly reduced. The scope of the work at Pratt & Whitney Aircraft covers all sections of engine crankcases, crankshafts, propeller shafts, various small parts, tools, jigs and fixtures. It is believed that the method also can be used successfully by other manufacturers.

Through the co-operation of Presto Battery Service, and Industrial Welding Company, both of Hartford, Connecticut, demonstrations of A. C. and D. C. equipment were held in order to observe the action of welding equipment in the field and to determine the most practicable type available.

A magnesium test block containing an assortment of drilled holes of varying depths into which plugs of steel were driven, was used in the demonstrations to determine whether butt welds of sufficient tensile strength could be made to withstand the forces necessary to extract the steel plugs. The percentage of success in extraction from this test block was sufficient to indicate a real possibility in this method if proper technique could be developed.

In observing the action of A. C. and D. C. welding equipment, it appeared that less arc flashing occurred with an A. C. welder than with the D. C. welder. This factor was important in that at Pratt & Whitney Aircraft most of the work involves magnesium or aluminum castings or forgings, and therefore it is advisable to avoid excessive heating or splashing of hot metal in order to positively preserve the heat treatment of these metals in the area of broken drills, and the quality of finished surfaces.

A Westinghouse A. C. Flex Arc Welder, consisting of a 20 to 250 ampere Flex Arc Welder 220V., single phase, 60 cycle A. C., on the Primary, a Welding Mask, Cables, a Welding Clamp and assorted welding rods, were purchased. The usual type welding rods which were supplied with the outfit were not the most suitable for the special job of removing broken drills, reamers, etc. The tests clearly showed that the bond between the broken part and the welding rod was strongest when the welding rod consisted of stainless steel. As a result fluxed stainless steel welding rods were substituted for the ordinary type. The hard flux on the outside of the stainless steel welding rods also serves effectively as an insulator especially when inserting a rod in a drilled hole where the broken drill is several inches below the opening of the hole.

In addition, a non-fuming compound for protective purposes on finished surfaces, known as "Spatter-off", was obtained. Having the consistency of medium lubricating grease, this can be spread easily in a light layer over any finished surface where protection from arc flashing is desired. When an arc flash occurs near the "Spatter-off", the heat of the arc immediately causes it to harden into a non-combustible layer of protective crust. After the welding operation is completed and the broken part is extracted, this protective coating can be quickly removed, and by de-greasing the part, the original bright quality of the finished surface is restored. In specific cases, other forms of protection from the arc flash are used. For example, wet asbestos powder, fiber washers or bushings, ¼" brass plate drilled to fit over the opening of the drilled hole (especially when the broken drill is at the surface of the hole) and other materials, depending

upon the requirements of the job to be done.

Necessary Equipment

A complete list of equipment as used at Pratt & Whitney Aircraft follows:

1. Flex arc Portable A. C. Welder 20-250 Amperes.
2. Welding mask having a No. 6 colored glass.
3. Leather apron for operator.
4. Suitable leather gloves for complete arm and hand protection.
5. Sturdy bench for holding work.
6. Foot controlled magnetically operated switch for Flex arc power supply.
7. Suitable Universal type insulated fixture for guiding welding rod into drilled holes in any angular position.
8. High pressure air hose.
9. Goose-neck flash light.
10. Assorted Stainless steel fluxed welding rods of 3/32″, 1/8″, and 3/16″ diameters.
11. Various and sundry small tools such as Bench Vise, ball-peen hammers, "dogs", etc.
12. "Spatter-off" and other protective material.
13. Cleaning material, i. e., Carbon tetrachloride, etc.

Technique

Fig. I

Figure I shows the operator preparing an Engine part for the extraction of broken drill. By using a high pressure air hose, the hole containing the broken drill is blown clear of all extraneous matter such as metal chips, oil, dirt, and bits of shattered drill. A small prod carefully used often helps considerably in removing metal chips jammed into the area between the cutting edges of the broken drill where the butt-weld is to be made. Particularly if the chips are aluminum or magnesium, it is always good practice to minimize the possibility of blow-back and unnecessary oxides in the vicinity of the welding surface due to the ignition of the chips at the moment the arc contact is made. As proper cleaning prior to the welding operation usually pays dividends in labor saved, carbon tetrachloride also should be used to wash out any cutting oil or coolant films remaining in the vicinity of the broken tool. This is a very important feature of the cleaning process.

Fig. II

Figure II further demonstrates the preparation of the part. Here the welding rod is already in the welding fixture, and the "Spatter-off" is applied to protect the finished surfaces of the part. In preparing the coated welding rod prior to its insertion into the welding fixture, it is good practice to round off the end of the rod on a grinding wheel to insure a good welding contact. Also, a "dog" should be tightened onto the rod near the end which is to be inserted into the welding fixture. The "dog" provides a place to apply impact with a hammer after the weld is made in order to provide an extracting force to the broken part.

The welding fixture shown serves a dual purpose. First, it guides the welding rod into the drilled hole in proper alignment with the center line of the broken drill. Secondly, after the weld is made it serves to hold the rod steady when applying the extracting impact with hammer blows. It is particularly useful when extracting small broken parts where the diameter of the drilled hole is in the vicinity of .040″ to 1/8″. The welding fixture is supported by a modified heavy duty lighting fixture, having its tubing replaced by solid shafting for greater rigidity. An arrangement of this sort is inexpensive and serves a satisfactory purpose when properly anchored to the bench.

Fig. III

In figure III, the weld has been made and the operator is about to apply to the "dog" the extracting impacts with a hammer. Note that the words "extracting impacts" are used rather than "extracting force". Broken drills when jammed tightly with chips, etc., respond to hammer impacts better than they do to steady pulling with a tensile machine or other means.

Test of Quality of Butt-Weld

The test of the quality of the butt-weld comes at this time as shown in Fig. III. Sometimes crystallization occurs in the weld or blow holes form due to the presence of cutting oil and various oxides, thus causing the weld to break under hammer impact. In such cases it is usually necessary to reinspect the point of contact of the stainless steel welding rod, clean the chip oxides from the drilled hole, or readjust the ampere rating of the power supplied to the weld to better suit the size and material of the broken drill. Frequently, however, it is discovered that the broken drill was shattered when it broke in the drilled hole. This necessitates several welding attempts before the solid part of the drill is reached. Experience shows that occasionally as many as five to ten tries

have to be made before a solid part of a drill can be removed. Also this frequently happens when unauthorized attempts are made to remove the drill by pounding the part, or by trying to drive it out with a prick punch, etc.

At this point it is advisable to stress the importance of having machine operators or set-up men make absolutely no attempts to remove any broken tool from engine parts. Frequently, a feeling of embarrassment on the part of the operator in having to report a broken drill or reamer, etc., to his foreman is the incentive which causes the operator to seek means of removing the broken tool himself. The usual crude method employed by an operator is trying to drive it out, or break

Fig. IV

it out piece by piece, with a prick punch and hammer. Experience shows that this method is seldom successful and usually results in burred surfaces and other forms of distortion which directly cause scrap or which tend to defeat the purpose of the arc welding method of removal. Also the use of a prick punch and hammer frequently results in broken punch points being tightly lodged in the hole above the broken drill, or jammed in between the flutes and the drilled hole, thereby making the removal operation more difficult, or impossible. If instances of this type can be avoided by having operators and set-up men immediately set aside the part containing the broken tool, without any tampering whatsoever, the results will be a greater chance of salvaging the part and a real saving of time in the salvaging operation.

Figure IV shows the eleven-thirty-seconds-inch drill as extracted from the hole in the bolting flange of the engine part. Due to protecting the finished surfaces with "Spatter-off" as shown in the area of the drilled hole, no damage was done to the part. As a result, it was immediately returned through the usual channels to the production lines. Under the old method of burning with electricity and compressed air, the complete removal of this broken drill would have required several hours of labor including the repair of hole after removal in this way. But by the new method of welding, the entire time of removal was only a few minutes and the drilled hole did not require plugging and reoperating or any other form of repair.

Layout of Apparatus

In figure V, the entire layout of apparatus to do this job is shown. Note the Flex Arc Welder at the right has plug-in positions to make available various ampere ratings from twenty to 250 amperes to suit the re-

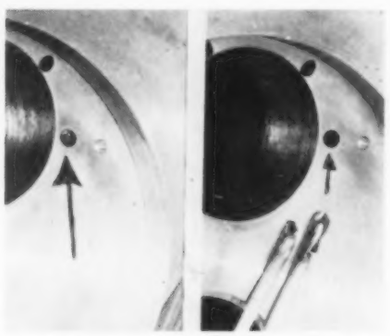
Fig. V

quirements of any job using welding rod from three-thirty-seconds-inch to one-fourth-inch in diameter. So far in the development of this welding method three-sixteenths-inch diameter stainless steel welding rod has been sufficient in tensile strength to do the toughest job at Pratt & Whitney Aircraft which was the extraction of a four-inch long seven-eighths-inch reamer having eight flutes.

The smallest size drill removed by this method was a .040-inch drill in the bottom of a five-sixteenths-inch hole three inches deep in an engine crankcase section. A previous method of removal would have been to trepan around the broken drill and insert a plug of the same material. This would then have necessitated the reoperation of the .040-inch oil hole in the production line. The time required for trepanning, plugging, relocating in the fixture and reoperating would have required several hours of labor. But by the new welding method actually used, a three-thirty-seconds-inch welding rod was ground down to a sharp point at the contact end and covered with an insulating coat of glycerothalate in the ground-down area. The current rating of the flexarc was reduced to thirty amperes, the welding rod was inserted in the three-inch deep hole, and centered on the .040-inch drill. Contact was made with the broken part of the drill and the power to the transformer turned on. The result was a butt-weld of sufficient strength to permit the extracting of the broken drill. As no damage was done to the .040-inch oil hole, the crankcase section immediately went back into production.

Instances of this kind are now being repeated daily, and with greater savings of time as the operator becomes more proficient in the art of using this equipment. The scope of the work has now increased to include the effective salvaging of all sections of engine crankcases, crankshafts, propeller shafts, cages, various small parts, tools, jigs and fixtures which are made useless by a broken drill, reamer, pilot or plug gage.

To further illustrate that the welding method is practical, figure VI



Before Fig. VI After

is used to show a drill and a reamer before and after removal. Figure VI, before, shows a .248 drill embedded in a drilled hole in an aluminum casting. Figure VI, after, shows the same hole and the extracted drill. Note that the drill was shattered and was extracted in two operations by the welding method. The stainless steel welding rod is shown welded to the two pieces. As the picture denotes, absolutely no damage was done to the hole or the finished surfaces.

Versatility Unlimited

New uses are being made daily of plywood for aircraft. Three recent developments include Fybr-Tech, with vulcanized fiber glued to veneers; Hollow-Core Panels, whose inner grids reduce weight and produce remarkable properties, and Compressed Plywood, which offers variable density. Details can be found below.

By JAMES R. FITZPATRICK
Director, Technical Plywoods
Chicago, Illinois

WITH metals on the critical list for the manufacture of armaments and weapons of warfare, plywood is being called upon to take its rightful place in airplane construction. This accelerated use of plywood has brought to the attention of the designing engineer a product that has unlimited possibilities in the design of airplane parts. The combination of strength and lightweight . . . the fact that plywood can be made from a variety of species that can be combined to make the best product for the use intended . . . that the direction of the grain in the various plies can be made at any angle to fit the needs of design, and that almost any curvature can be obtained, have offered a challenge to the engineering profession. Plywood is not a new product, but many of its physical and mechanical properties are little known by the designing engineer; and in order to adapt plywood to uses such as wing and fuselage coverings, leading edges, gusset plates, nose and tail pieces, webs in box beams, floors, walls, and numerous other parts, it is necessary for the engineer to become acquainted with the advantages of each species for the various uses, and the differences in design procedures when the plywood is used in place of metal.

Today, we have in the air complete plywood planes often referred to as plastic planes. In reality they are plastic only in the sense that phenolic resins have been used as the adhesive in manufacturing the plywood. The majority of aircraft plywood is made with phenolic resin as the bonding agent. This resin is a comparatively recent discovery. Heretofore, the glues used were not of the thermosetting type and their characteristics were changed with changes in temperature and humidity, but now plywood is manufactured so that extreme changes in atmospheric conditions, as encountered under actual flying conditions, have little or no effect on its properties.

Besides the small all-plywood planes, and the many parts listed previously where plywood is already playing a big part, we have recently converted numerous metal parts to plywood construction that are in every way equal and in many respects superior to the metal product. Among these are strip assemblies, chute assemblies, fixed gun cases, chartboards, folding floors, bomb bay access doors, pilot seats, bombardier's seat assemblies, jump seat panels, turret transit covers, tunnel flooring, wing tips, flippers, and elevators.

Plywood Research

The Forest Products Laboratory at Madison, Wisconsin, has developed information on the physical and mechanical properties of species suitable for use in aircraft construction and as veneers for aircraft plywood. Fundamental data on plywood has also been derived from test results, but the laboratory has under way at present a program of research devoted to the solution of the more complex problems confronting the designer of plywood aircraft parts. Among these are the development of formulas for the design of flat and curved plywood plates, the effect on strength of the combination of species, and the number and thickness of plies, the effect of repeated stresses, and methods for the design of stressed skin structures.

Of particular importance to the designing engineer is a knowledge of the properties of the species used in aircraft plywood, their fitness for a specific job, the weight and thickness of veneers used in the various panel constructions, design values, and the general properties of plywood panels. We have recently compiled all of this information and it is in the process of being published. It will be made available to engineers working with plywood. As new data is developed, it will also be correlated in a form suitable for publication.

Recent Developments

Fybr-Tech: We have recently developed a product known as "Fybr-Tech" which consists of a vulcanized fiber glued to veneers to produce a panel of unusual strength and lightness. The chief merit of this product lies in its extreme adaptability and ease of working. It can be sawed, drilled and die-punched, the machinery leaving a clean edge free from burrs. The surface of Fybr-Tech is tough and non-splitting and it resists cuts and scratches. Moreover, it is resistant to most substances and liquids with which it would normally come in contact. Recently it was used in the bus transportation field where by substituting it for steel and aluminum a saving of over 300 lbs. per bus was effected. These busses have interiors made of Fybr-Tech used as window panels, package racks, head linings, and air conditioning vents. There are hundreds of busses now equipped with this material, and one airplane company has signified its intention of using it on plane interiors.

Hollow-core Panels: Another type of panel has come into use known as a hollow core panel. It consists of two faces of thin plywood with a core of spruce grids or egg crate cubicles all glued to make the complete panel. This construction is designed to produce a light weight panel suitable for floors and doors. Many planes are equipped with floors of this type.

Recent experiments have shown that the hollow core panel has some remarkable properties. Several panels 56″x18″x21/32″ in thickness with a top face consisting of a three-ply birch panel (1/22″, 1/28″, 1/22″) and a bottom face consisting of two plies of birch (1/62″) and .010″ fiber were tested in several ways. The core was made of 1½″ x 1½″ cubicles resin bonded and the entire weight of the panel was .88-lb./0′. The over-

all thickness was slightly over 5/8" with a 1/8" face and a scant 1/16" back.

These tests showed that this type of panel was capable of supporting over simple and fixed supports on ultimate load uniformly distributed of 800 lbs. per square foot.

Compression tests made with a steel crushing block 1" x 6¾" applied in various positions showed that an average ultimate load between the grids was 1,480 lbs. and over the grids was 2,040 lbs.

Heel or puncture tests consisted of applying a load by means of a steel rod with a cross-sectional area of 1.2 square inches in the shape of a woman's heel. These tests proved that the panels are capable of supporting a woman's weight on one heel of a high-heeled shoe. The ultimate load taken in the most critical positions; for example, not over any supporting grid, was 520 lbs. and failure did not carry over into adjacent grids.

Compressed Plywood: The use of hot-pressed thermosetting resin adhesives for the manufacture of waterproof plywood requires pressures that seldom exceed 200 lbs. per square inch, and the total compression of the wood or reduction in thickness is rarely more than 10 per cent. Recently, however, the possibility of increasing the pressures used in the manufacture of resin-bonded plywood has opened up an entirely new field for plywood. Tests have been made on plywood subjected to pressures from 500 to 1,500 lbs. per square inch, and today a few manufacturers are making this high-density or compressed plywood.

By increasing the pressure applied in the hot plate process a reduction in thickness results which means that there is more wood fiber per square inch of cross section, and the compressed product will be stronger per square inch than ordinary plywood. The technique of using thin veneers, numerous plies, and subjecting them to a high degree of resin impregnation under high pressure produces a product that has distinct advantages where the governing factors in design are based on the ratio of the strength and weight of the material. The strength-weight ratio of compressed plywood makes it an ideal material for use in airplanes. Its properties can be used to advantage in the design of reinforcing plates for the attachment of spars to the fuselage, gusset plates for ribs, hinges, floors, walk, instrument panels, and seats. Many other uses in war production are possible such as ribs and stems for boats, gun stocks, handles, gears, and dies.

It is also possible to manufacture a variable density plywood; that is, one that has extra lamination at one end. In this type of construction one end will be denser and stronger than the other, but the entire panel will be the same thickness. The final product has distinct advantages in propeller construction because the high-density section can be attached at the hub where strength is needed, and the low-density section towards the tip of the propeller reduces centrifugal forces.

Compressed plywood is manufactured in the same manner as ordinary plywood, except higher pressures are used. There is also being made today an impregnated plywood. This method consists of soaking sheets of veneers in a phenolic resin solution until the desired impregnation is obtained.

Of course, the time required for impregnation can be reduced by mechanical means. After impregnation the surplus resin is evaporated and the veneers are assembled into plywood by means of a hot plate press. Lower pressures can be used with impregnated veneer to obtain the same amount of compression as that developed in resin film plywood. However, the manufacture of compressed plywood with liquid resin impregnates is more complex and requires more time and care.

Like all new materials, there is much to learn about the action of compressed and impregnated plywood under varying conditions of use. However, the increased strength properties resulting from higher specific pressures are extremely encouraging. For instance recent tests on compressed plywood made up of 1/48" birch veneers with alternate cross layers showed that by increasing the pressure from 200 to 1,000 lbs. per square inch the test pieces increased in load-carrying capacity from 8,500 to 14,200 lbs. per square inch in compression, from 12,500 to 25,700 lbs. per square inch in tension, and from 7,200 to 16,100 lbs. per square inch in shear.

High Frequency Methods: A rather new development in the manufacture of plywood is known as a high frequency method. The manufacture of plywood by this method means that the heat required to form the bond between the veneers is created by an

MINIMUM OF METAL IN

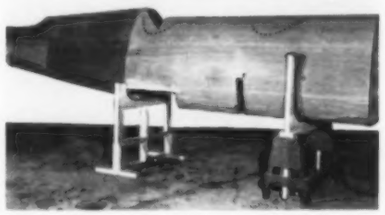
A notable advance in construction has been achieved with standard size, flat plywood sheets bonded by cold-set. The only molded section in Ryan's new PT-25 is the leading edge of outer wing panel. Metal fittings are simple welded sheets and tubing.

ON contract for the U. S. Army, the Ryan Aeronautical Company, pioneer of the low-wing training plane field, has completed a new plastic-bonded plywood military primary trainer of advanced design which is believed to be the nearest approach yet reached toward the almost complete elimination of strategic materials in military aircraft.

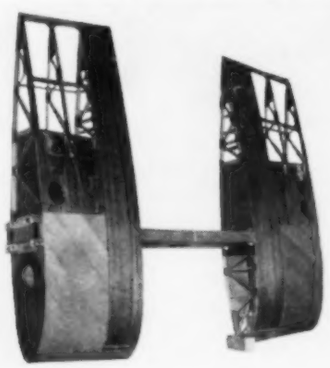
Aluminum alloys and all strategic materials have been eliminated with the exception of the engine cowling which represents less than 2 per cent of the total weight of the airplane. No forgings, castings or extrusions are used, nor are critical steels used for any of the fittings or structural parts.

Ryan's plywood trainer not only

PT-25 FUSELAGE is built in two sections —tail cone and cockpit. Note four flat sheets of plywood covering cockpit section.



STURDY CENTER-WING section is composed of monospar, nose ribs and trailing edge ribs, 75 per cent plywood covered. Note plywood gas tank cells.

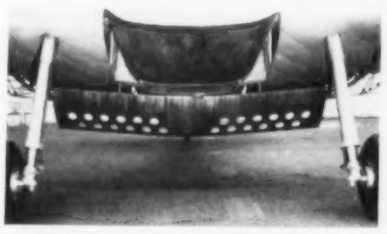


RYAN'S PLYWOOD TRAINERS . . .

retains the "eye appeal" which has always characterized the long line of highly successful and popular Ryan S-T trainers, but carries the design development to its most advanced stage with a beautifully finished, nicely proportioned full cantilever construction.

In every design detail, full advantage has been taken of most modern practices with the result that aerodynamically the plane is one of the "cleanest" primary training planes to ever make its bow. The smoothness of line has been obtained with a minimum of compound curved surfaces resulting in a manufacturing method which does not require use of ovens or baking methods in forming the bonded plywood since cold setting urea formaldehyde glues are used throughout.

LANDING GEAR and brake detail shows center-section perforated flap, electrically operated. Landing gear design is exceptionally clean.

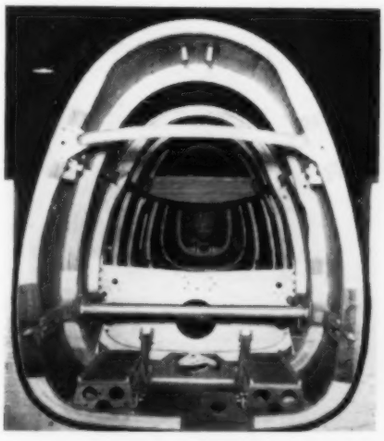


Little special equipment is required in building the new Ryan plywood trainer as cold-setting urea formaldehyde glues, which do not require "tricky" handling, are used. The only molded plywood section is the leading edge of the outer wing panel. Standard size flat plywood sheets are employed for all other parts of the airplane, and since all shaping of the fuselage and other units is done over large radii, no complex forms are required for fabrication.

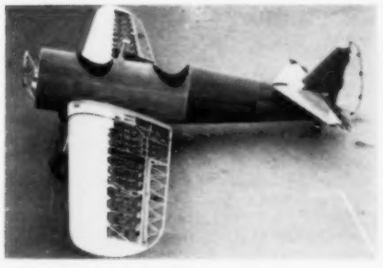
Metal fittings where necessary are of simple welded sheet steel and steel tube, but the Ryan Company is already conducting research work which may later make it possible to convert most of the secondary structures to plastic materials. In addition, studies are under way looking toward the eventual adoption of plastics for the primary structures.

It is powered with a 185-horsepower Lycoming six-cylinder, horizontal opposed, air-cooled engine. Joe Rust, Ryan test pilot, described its flight characteristics as ideal for military training.

FUSELAGE DETAIL shows laminated spruce bulkheads, built-up center-wing spar, and two metal parts—engine mount tie-through bar (top) and torque bar (below).



FITTED TOGETHER, components of PT-25 show details of the basic airframe structure before installation of skin and power plant.



electric current oscillating at a very high frequency.

In a condenser the lines of force run perpendicularly across the space between the plates. This space is called the dielectric and any body placed between the plates is part of the dielectric. When oscillation becomes rapid enough it affects the dielectric and produces heat.

The capacity of a condenser is measured by the amount of electricity that it is capable of storing. This amount varies with the kind of dielectric. Dry air does not absorb energy and is, therefore, not heated.

If we consider the capacity of a condenser, with dry air as the dielectric, as unity, then the capacity with some other material between its plates is called the dielectric constant of that material. Dry wood has a dielectric constant of 3.6, but water has a dielectric constant of 81.0. This means that wood will absorb more energy in the form of heat when it is wet, and the greatest heating effect will be in the wettest portion of the wood.

In the manufacture of plywood with high frequency electric fields it is possible to heat the glue lines in any thickness of veneers. Moreover, the wet glue can be made hotter than the wood, and danger to the wood is eliminated. The high frequency method prevents the over drying of veneers and shortens the time of cure of the resin bond in plywood considerably.

In the manufacturing operation the electrodes are placed on the opposite sides of the plywood assembly with insulating material between the electrodes and the heads of the press. Pressure, provided mechanically, is just as important as in the hot-plate process.

In the conventional hot-plate process moisture losses at the surface vary between 5 per cent and 10 per cent, but in the high frequency method the moisture loss is only about 1 per cent at the surface. Up to the present time this method has not been thoroughly investigated, particularly with reference to thin panels. There is one unit in operation on the West Coast manufacturing heavy panels. They can produce from 12,000 to 15,000 square feet per hour using a $\frac{3}{8}$" panel and a press 4′ x 8′ with a charge of sixty panels at one time.

Indications are that the high frequency method is much faster for the manufacture of thick panels. There is much possibility of using this method on molded panels with the wooden cowl forms made of high-density or compressed plywood. In this manner it may be possible to produce many airplane parts of plywood which because of their shape now must of necessity be made of metal. This is being thoroughly investigated, and soon we hope to see intricate shapes produced inexpensively.

Conclusion

We can come to the conclusion that we have a product in phenolic resin-bonded plywood that has already proved its value as an engineering material, and that in light of recent developments in manufacturing methods and design procedures, the possibilities for plywood seem at present unlimited.

They Made Their Own Tools

and Won the Army-Navy E

By TONY HAGMANN AND HAZEL STRONG

AMERICA'S margin of superiority over the Axis is being emphasized by the Army and Navy "E" awards for war production excellence.

HOME-MADE VERTICAL milling machine for routing quarter-inch steel cost Universal only a fraction of a new machine's value.

One of the most impressive records on the industrial front has been made by a Texas firm which assembled complex machine tools from discarded junk and delivered vital Air Corps equipment in large quantities ahead of schedule.

Before the war, Universal Building Products Corporation of Dallas made windows of steel and non-ferrous metals, display frames and fixtures for theaters, under the banner of Sealuxe. The odds were against success when they converted into a full-time war industry, but in 1940, J. P. Travis, who heads Universal, saw the necessity of converting in order to aid the war effort. He made trips to the experimental department of the Army Air Corps to determine just how his company could be best utilized. The result was a sizeable contract for the manufacture of a portable field maintenance hangar, designed to facilitate the servicing in the field of all types of airplanes, under all conditions. Mr. Travis calls the device a "panzer" hangar. It is a collapsible framework of metal covered with canvas which can be easily transported by air and reassembled in forty-five minutes at operational airdromes to provide shelter for crews and equipment during maintenance work. It is mounted on wheels and can be rolled about, accommodating all sizes of bombers, fighters and trainers.

MASTER CRAFTSMANSHIP in large-scale deliveries of this Air Corps Portable Maintenance Hangar won distinction for Universal Building Products. The device is in war use around the globe.

J. P. TRAVIS
President, Universal Building Products Corporation

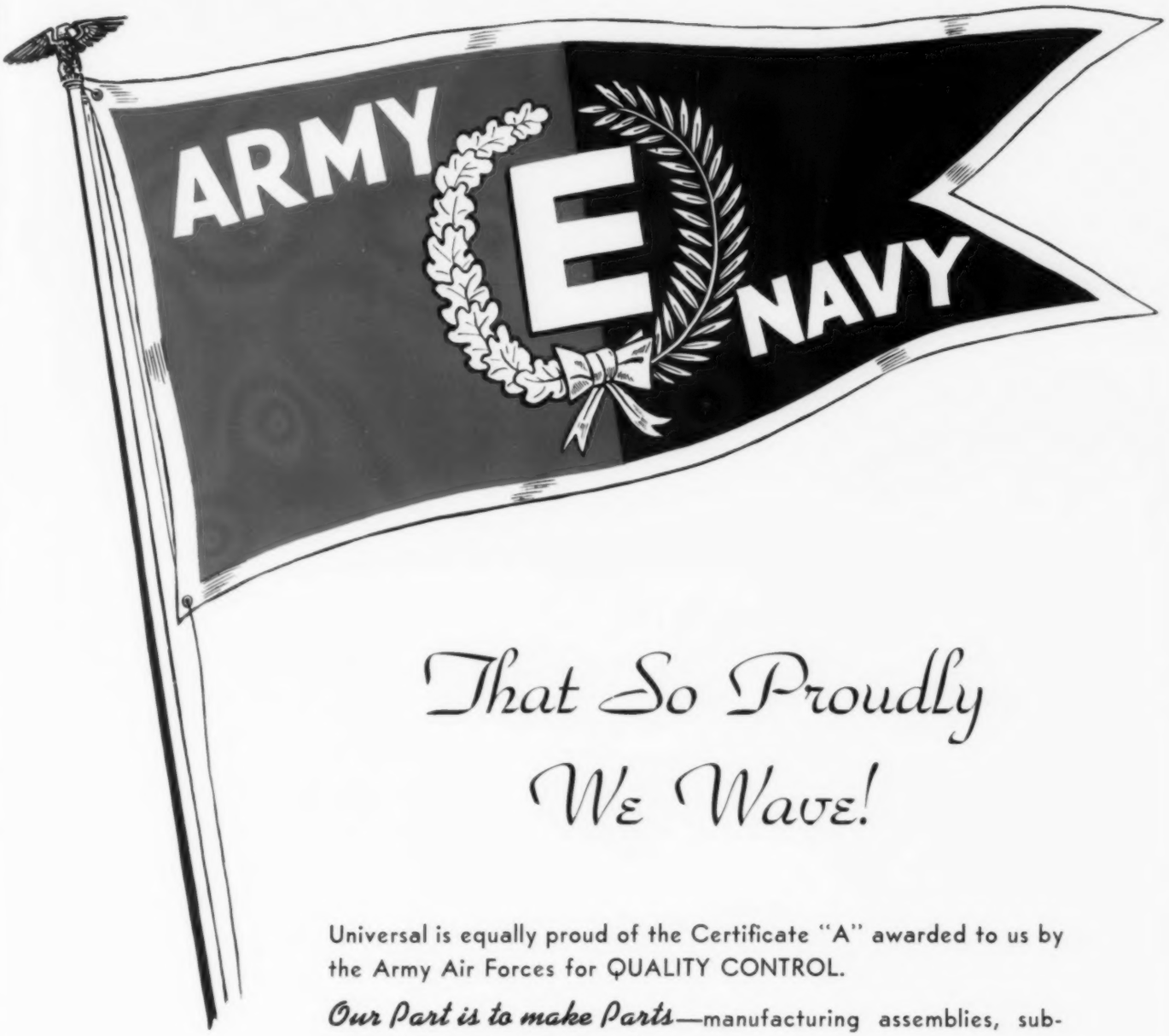
Starting from Scratch

The Army, engaged in greatly expanding its Air Forces, was in need of huge quantities of the unique hangar, without delay. Travis soon learned, however, that the machine tools he needed were virtually nonexistent. Those that could be used were already allotted to the great aircraft plants and other industries which were racing against time to arm the nation. But Travis and his plant manager, Andrew Larson, figured they would have to design most of the equipment anyway, and decided they had just as well design the machine tools also. They raided surplus material piles, haunted used and discarded machinery lots and set about designing and manufacturing the machinery on which they would produce the hangars.

The whole plant is a monument to skill and ingenuity. It has some

(Continued on page 48)

ANDREW LARSON
Plant Manager



That So Proudly We Wave!

Universal is equally proud of the Certificate "A" awarded to us by the Army Air Forces for QUALITY CONTROL.

Our Part is to make Parts—manufacturing assemblies, sub-assemblies and aircraft parts.

Complete facilities are available for the manufacture of . . . . .

- Portable Airplane Hangars
- Combination Portable Parachute Drying Towers, Machine Shops and Crew Barracks
- Adjustable Crew Chief Stands and Platforms
- Tow Targets
- Hand Wheels
- Anchors
- Portable Hoist and Gin Pole
- Starter Crank Extension Brackets
- Automatic Pilot Gyro Supports
- Aileron Supports and Brackets
- Oxygen Cylinder Supports
- Wing Track Flat Brackets
- Tail Wheel Assemblies
- Overturn Assemblies
- Cockpit Enclosures
- Nacelle Assemblies
- Ladder Assemblies
- Engine Mounts
- Gun Turrets
- Bomb Racks
- Glider Fuselage Assemblies, and other Welded Tubular Assemblies and Sub-Assemblies in Glider or Airplane Construction

UNIVERSAL BUILDING PRODUCTS CORPORATION

2625 Elm St., Dallas, Texas

THEY MADE THEIR OWN TOOLS

(Continued from page 46)

"home" designed machines built for speed and efficiency, turning out better work at a faster clip than standard types could possibly do. For example, special milling machines were on the "impossible-to-get" list. High speed grinders were substituted. One grinder and two men replace twenty-five men on twenty-five milling machines.

To make a pneumatic bending machine which is used for the hot bending of carbon steel tubing, they gathered some cylinders from an automobile of unknown make, added some new pistons, and wound up with a machine doing first-class work. Fifty per cent of this one machine was recovered from the junk pile.

Mother necessity brought about a home-made piece of equipment for drying sand or sand blasting. With a discarded butane gas cylinder, some scrap steel, plenty of ingenuity they turned out a piece of equipment that really does the job.

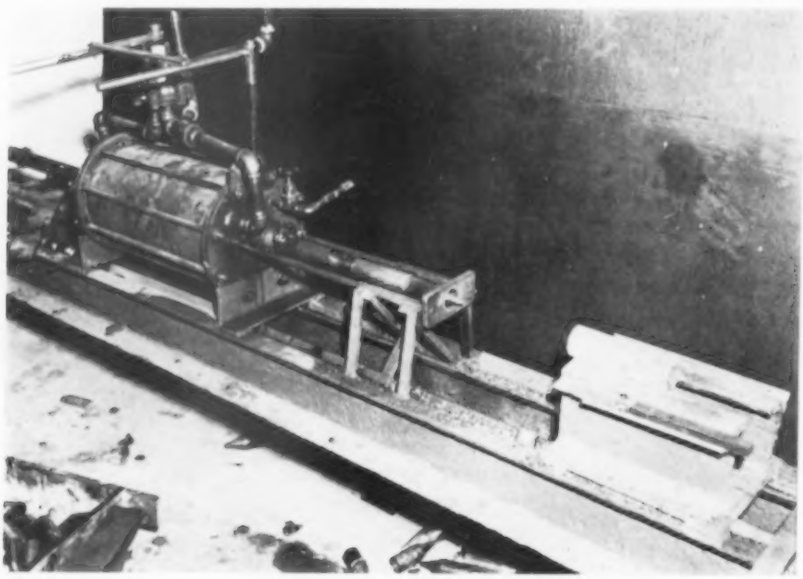
A vertical milling machine, about $3,000, was necessary but unobtainable. The men went to the junk heap, dug up an old piece of ten-inch H-beam to which they welded hand-forged gadgets and attached a motor. Result: a machine made especially for the job. Total cost: $300.

Labor Does Its Part

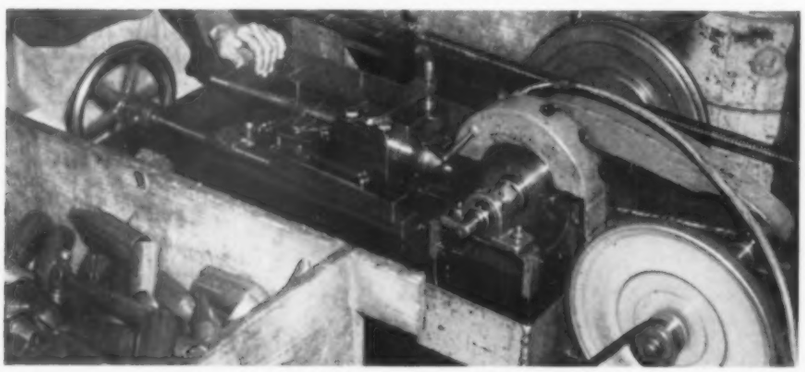
The machinery and equipment problem settled, there remained a small matter of finding the men and women to run them. Texas has never been overburdened with precision tool experts. Travis hired the "Bill Joneses" —filling station operators, farm help, ranch hands—and trained them to wrestle with a new line. Mentally above-the-average raw help, willing above all, these men and women put their best efforts toward making the company the success it is today.

Universal has never had "employe" trouble. When the whistle blows for a change of shift, on goes the music. Every man and woman leaves the plant to the tune of "Amen" or "Swing It Sister". Usually they take a quick look at the bulletin board to check the latest news. Travis has established a custom of posting the latest telegrams and letters from the Army and Navy which may contain praise or comment on the work they are doing.

JUNK AUTO parts compose most of this pneumatic bending machine for shaping steel tubing.



IMPROVISED RAM uses 6,000 pounds pressure per square inch in finishing parts. It is double-acting.



CHEVROLET FLYWHEEL and other auto parts made this efficient milling machine. Shaft and bearings were made in the shop.

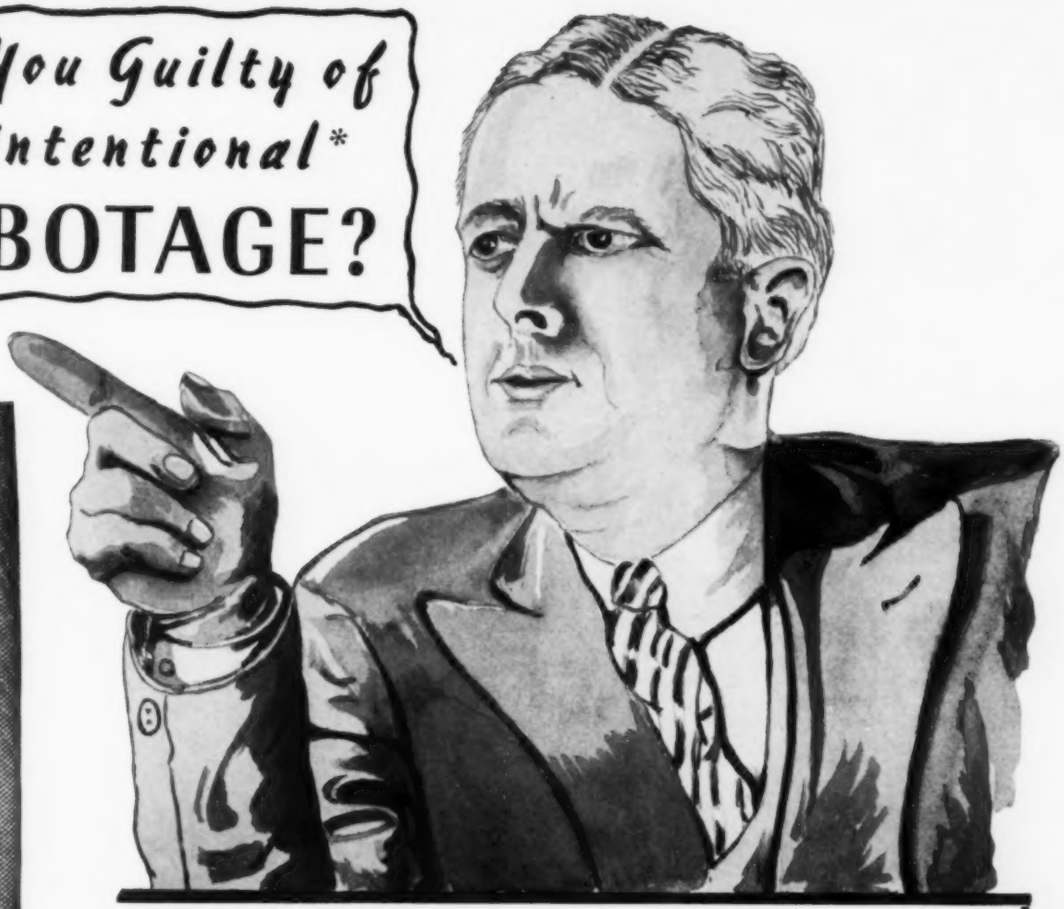
The employes have clubrooms for play, an educational hall for first aid, fire drill, Air Raid Warden classes. Plant police meetings and "Training Within Industry" meetings are faithfully attended.

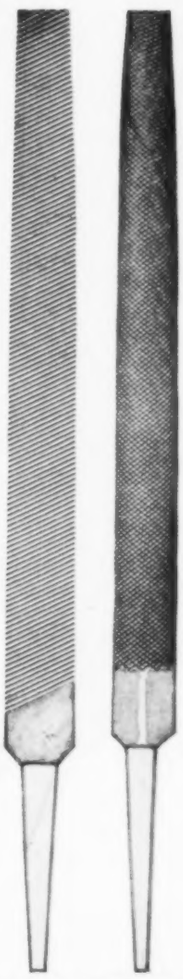
The first recognition received was Certificate "A" presented by Major Frank C. Merrill, Air Forces representative. Certificate "A" is given to plants which can be entrusted with the full responsibility of meeting government requirements. The Air Corps is making only a general inspection now.

Universal sailed along, working more people, more machinery, turning out more material, keeping up the standard of production they had established. When the Army and Navy "E" award was mentioned as being in line, the highest honor a production plant can be given, Universal dug in their spurs and held on to the Stetson. No one could measure the pride.

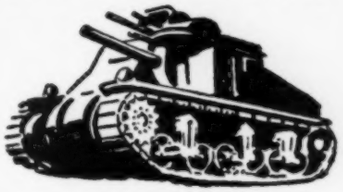
On October 7, the coveted award was presented to Universal by the Army and Navy officials, for achievement in industry.

*Are You Guilty of Unintentional** SABOTAGE?





Throwing away dull Files wastes enough vital Steel in one year to build over 1,000 28-Ton Tanks!



ARE YOU GUILTY OF SUCH UNINTENTIONAL SABOTAGE?

* A very conservative estimate compiled by our Engineering Department discloses that, if all Files manufactured and sold in the Nation during one year were resharpened, over 30,000 tons of vital Steel could be saved! . . . Plus approximately 10 Million man-hours of labor and 6 Million Dollars' worth of Electric Energy and other supplies!

SAVE YOUR DULL FILES! HAVE THEM RESHARPENED THE "TRU-VIX" WAY!

"TRU-VIX" is NOT an "Acid Bath"

Do not confuse the "TRU-VIX" system with the so-called "etching", "electrolysis" or any other acid process. You want your Files actually SHARPENED, not just "cleaned". "TRU-VIX" is a **Mechanical** resharpening system that actually sharpens the teeth of ANY type of File, in the same manner as employed in the resharpening of Reamers, Milling Cutters, etc. The teeth are **ground** with abrasive, not **pickled** in acid.

The "TRU-VIX" file resharpening process has been successfully proven as efficient and economical for over 15 years.

We also carry a Complete Line of Specialized Tools and Supplies for:

MILLS, SHIPBUILDERS, AVIATION, AUTOMOTIVE and INDUSTRIAL PLANTS

★ *Every Purchasing Agent should have a "KEYSTONE" Catalog, illustrating thousands of items of interest to Aviation, Automotive and Industrial Plants. Call the Keystone man Today!*

* **ANY TYPE OF FILE, regardless of size, shape or character of tooth, can be successfully resharpened by the "TRU-VIX" system at only a fraction of the cost of a new file.**

Distributors for: HELLER BROTHERS, "NU-CUT", "WESWOOD" and "VIXEN" Files

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President Roosevelt Inspects Consolidated's Huge Texas Operation

A surprise visit to the Consolidated Aircraft factory at Fort Worth was made recently by President Roosevelt, who spent an hour inspecting the nation's longest powered-assembly line for aircraft. With him were Mrs. Roosevelt, their daughter-in-law, Mrs. Elliott Roosevelt, and the latter's two children. George Newman, Consolidated vice president in charge of the Fort Worth Division, was host.

The Commander-in-Chief saw the birth of giant four-motored B-24's and cargo planes from the raw materiel stockpiles to test flight. There were sixteen autos in the chief executive's party and they toured the interior of the giant factory as if the aisles along the production line were highways. Mr. Roosevelt's private train was waiting for him afterwards—parked inconspicuously on one of the interior railroad tracks hidden among the rows of bomber parts and tools.

Before the train rolled out of the factory, President Roosevelt and the First Lady signed an autograph book for Miss Norma Resh, secretary to Newman. Comment by the President, as he viewed work in the plant, was not revealed. However, he appeared visibly impressed by the enormity of the plant.

Industry Increases Savings in Contracts While Upping Output

The dollar value of airplanes produced per man-hour worked has been raised 36 per cent by the aircraft industry since Pearl Harbor, thus saving the government money and the nation precious time, Donald W. Douglas, president of the Douglas Aircraft Company, reported September 29 at the semi-annual meeting of the Aircraft War Production Council in Los Angeles.

He also reported Council member companies have increased their deliveries of aircraft more than 113 per cent since the war started last December, with cargo plane deliveries up more than 1,100 per cent.

The Council elected Harry Woodhead, president of Consolidated Aircraft Corporation, as president to succeed Douglas. Robert E. Gross, president of Lockheed Aircraft Corporation, was named vice president. Other senior directors are J. H. Kindelberger, president of North American Aviation, Inc.; La-Motte T. Cohu, chairman of the board of Northrop Aircraft, Inc.; T. Claude Ryan, president of the Ryan Aeronautical Company; Courtland S. Gross, president of the Vega Aircraft Corporation. Woodhead represents Vultee as well as Consolidated on the Council board.

DIESELS FOR AIRCRAFT are studied at first-hand by Texas A. & M. College students since Allen Guiberson (left), president of the Guiberson Diesel Engine Company, presented a 650-horsepower model to Dean Gibb Gilchrist.

Solons Cite Box-score To Praise Our Planes

American Aircraft are more than a match for enemy planes, the House military subcommittee on aviation has reported. It sighted the following box-score:

1. From February 1 (date at which accurate breakdown figures by type of plane started) through September 20—enemy planes destroyed in combat by Army aircraft for all types on all fronts, 279. United States planes destroyed in combat on all fronts, 114.

2. For the month of August—P-39's (single-engined fighters) destroyed in combat nineteen enemy planes with a loss of four P-39's. For the same period P-40's (single-engined also) destroyed eighteen enemy planes with a loss of two P-40's.

3. For the month of August—enemy planes destroyed in combat, seventy-five; United States planes lost in combat, fifteen.

4. In the thirty-day period August 14 through September 14—the ratio of enemy planes destroyed to United States losses in combat was 7.5 to 1. The precise figures are not disclosed in this instance only because the information is sufficiently new as to be of possible use to the enemy. During the period the P-39's destroyed twenty enemy planes in combat with a loss of five, and the P-40's destroyed fourteen enemy planes with a loss of one.

"This record," said the committee, "should be a complete answer as to the fighting qualities of our planes."

Former WPB Aide Gets Aero Chamber Post

Robert P. Newton of Washington, D. C., has been elected senior vice president of the Aeronautical Chamber of Commerce. He formerly was assistant chief of the War Production Board's bureau of priorities and has been actively interested in the aircraft industry for several years. He holds a private pilot's license. Newton served in France during the last war as a captain of the 7th Field Artillery in the First Division. He was a member of the firm of Boettcher, Newton & Co., of Denver, Brokers, until 1937.

Women Deliver Cubs

Twelve women are on the staff of thirty-five pilots maintained by the Piper Aircraft Corporation at Lock Haven, Pa., to deliver its planes by the fly-away method.

American Aircraft Used by British Are Listed

U. S. aircraft serving with the British Royal Air Force include seven types of bombers, seven different fighters, four coastal patrol models, three trainers, and three transport types. The British fleet is using two American-built models.

In addition, the RAF has been detailed a number of Lockheed P-38 (Lightning), Vultee V-72 (Vengeance) and Republic P-47 (Thunderbolt) types which have not yet been reported in action.

In use by the British are:

Bombers: Martin 187 (Baltimore), Martin 167 (Maryland), Martin B-26 (Marauder), Douglas DB-7 and DB-7B (Boston), Boeing B-17C and B-17D (Flying Fortress), Consolidated B-24D (Liberator), and North American B-25 (Mitchell). The B-25's will soon be placed in action.

Fighters: Brewster FA-2 (Buffalo), Douglas DB-7 and DB-7A (Havoc), Curtiss P-40D (Kittyhawk), Curtiss P-40B (Tomahawk), Curtiss P-36 (Mohawk), North American P-51 (Mustang) and Bell P-39 (Airacobra).

Coastal: Lockheed B-28 and B-29 (Hudson), Vega B-34 (Ventura), Consolidated B-24 (Liberator) and Consolidated PBY5 (Catalina).

Trainers: North American AT-6 (Harvard), Piper Cub and Taylorcraft.

Transport: Douglas DC-3, Lockheed 14 and Lockheed 18 (Lodestar).

Navy: Grumman F4F (Martlet Fighter) and Vought Sikorsky OS2U-3 (Kingfisher Light Reconnaissance).

PIONEER WOMAN bomber builder is title of Julia Moffit, who received a trophy on her first anniversary at Consolidated's San Diego plant. Of original group of forty women, twenty-five are still on the job. Foreman R. Bibb made the presentation.

FOR VICTORY THROUGH AIR POWER

8 Reasons to look to the South and Mid-America

• Among thousands of military aircraft made in the South are these North American AT-6 trainers poised for fly-away delivery throughout the Western Hemisphere.

★ 90 per cent of all military flight training.

★ Year-around flying weather and strategic Mid-American location advantageous to both training operations and production.

★ Thirty-three major aircraft plants and hundreds of subcontractors.

★ Produces one-third of the nation's aircraft with a dollar value in the ten-figure column.

★ Produces more twin-engined trainers than all other areas combined.

★ Four-engined bombers and cargo ships produced in ever increasing quantity.

★ Glider production expanding rapidly.

★ This great area is definitely airminded and is doing everything possible to encourage the development of every phase of aviation.

The South serves Aviation and . . .

SOUTHERN FLIGHT SERVES THE SOUTH

MASS-PRODUCED THUNDERBOLTS are reaching the fighting fronts in growing number. Here's a corner of a Republic Aircraft Corporation factory showing the P-47's final assembly line, where 2,000-h.p. engines are mounted.

Republic's New Indiana Division Delivers P-47's Nine Months Ahead of Time

The Republic Aviation Corporation in mid-September inaugurated production of 2,000-h.p. P-47 Thunderbolts at its Indiana plant nine months ahead of schedule and after only five months of preparation. In ceremonies celebrating the occasion, Brig. Gen. Arthur W. Vanaman, Materiel Center commanding general at Wright Field, Ohio, announced that Republic's production will soon surpass that of the entire industry in 1939. President Ralph S. Damon promised that the Indiana division will deliver by Columbus Day (October 12) "all of the airplanes scheduled for delivery by Christmas." Vice President George A. Meyrer is general manager of the Indiana division.

Poles Praise Mustang

Pilots of a Polish squadron operating with the Royal Air Force Army Co-operation Command "are convinced" that North American Aviation's P-51 Mustang fighters are the "finest in the world." This was the praise cited by Baron de Ropp of the Polish Information Center in New York in a telegram to J. H. Kindelberger, NAA president.

Patent Plan for Workers

George J. Newman, vice president of Consolidated Aircraft Corporation in charge of the Fort Worth bomber plant, has inaugurated there the firm's liberal patent protection plan. Royalties up to 30 per cent are provided workers who furnish new and worthy shop and design ideas. The plan has been operated in the San Diego plants for some time.

Fuel Production Boosted

Petroleum Co-ordinator Harold L. Ickes has reported a "huge" increase in 100-octane gasoline production for aircraft—"far beyond what anyone believed even remotely possible a year ago." Details were not stated, but he said additional refining facilities are under construction.

Trucks "Ferry" Planes, Parts to Southwest

Increasing use of giant cross-country trucks in "ferrying" aircraft and their components from distant plants to Southwestern assembly and modification points has been reported. A trailer manufacturer's recent magazine advertisement told how Lockheed P-38's are hauled overland and an automotive industry publicity release tells of a Detroit auto plant launching a shuttle system between Michigan and Texas with a fleet of ninety trucks.

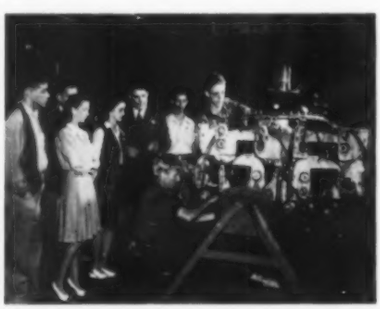
One of the trucks, seventy-three feet, seven inches long and equipped with five axles and eighteen wheels counting the trailer, weighs from 50,000 to 63,000 pounds fully loaded. They are powered by twin auto engines, mounted on slide arms to allow installation of new engines within only fifteen minutes instead of making major repairs.

The publicity, issued by the Automotive War Production Council, says the fleet of ninety truck-trailers is divided into five squadrons of eighteen trucks each. One day's output at the Detroit plant will require eighteen trucks. Four of the five "squadrons" will be on the road constantly, while the fifth is either loading or unloading. Two of the truck-trailer units are equivalent to seven freight cars, the release stated, and special design allows them to be loaded in 150-man hours less than is possible when shipping by rail.

Details of the Lockheed hauling have not been made public, the trailer advertisement being the only mention noticed.

Hot Meals for Workers

Ten mobile kitchens are now furnishing hot meals to workers in the California plants of Consolidated Aircraft Corporation. A caterer instituted the service after spending $100,000 in special equipment, including paper utensils instead of silverware, glassware and crockery, which are not allowed into the plants.



WORKERS SEE PLANT to learn how their efforts fit into overall picture in the Wright Aeronautical Corporation's Ohio operations. Each of the thousands of workers is escorted on a thorough inspection of the Cyclone engine factory.

Lockheed Needs Only Materials to Boost Production 40 Per Cent

Physical expansion of the Lockheed plant in Los Angeles County stands at the practical limit, Robert F. Gross, president, said recently. However, ample material supply would increase its production 40 per cent.

The new cargo plane, the Constellation, will undergo tests soon.

More About Women

Douglas Aircraft Company's hiring of women topped all records in August, 70 per cent of the new workers being female.

Gill Robb Wilson Honored

Chosen as the individual whose achievements in aviation were most outstanding for the year, Gill Robb Wilson, president of the National Aeronautic Association, has been selected by Air Service Post 501 of the American Legion to receive the William J. Gough Memorial Trophy. Col. J. Carroll Cone, post commander, said the award will be made at the October meeting.

Kaiser-Hughes Building Three Seven-Engined, Sixty-Ton Flying Boats; Duramold Plywood Process Used

The Defense Plants Corporation, a subsidiary of the Reconstruction Finance Corporation, has issued a letter of intent authorizing Henry J. Kaiser and Howard Hughes to build three seven-engined cargo flying boats within twenty-five months at a total cost of $18,000,000. The craft will be of the twin-hull type, capable of transporting sixty tons in maximum cargo, forty tons on a 3,000-mile hop, or twenty tons on a 6,000-mile course.

They will be constructed by the Duramold process of plywood plastics, with 60 per cent of the weight devoted to wood and the rest being aluminum, chromium, nickel, molybdenum, manganese, iron, zinc, magnesium, copper, tungsten and rubber. The seven engines will be of 2,000 horsepower each, furnished by the Army and Navy, three being located between the twin hulls with the remaining four on the outboard wings.

Kaiser said the planes will be built in the Hughes plant at Culver City, California, and that the first will be finished in fifteen months, the second in twenty months, and the third within twenty-five months. Donald Nelson, War Production Board chairman, said Kaiser and Hughes would derive no profit from the order but "are contributing their time and talent in the interest of what they believe will be a major contribution to the war effort." As the experimental order takes shape, Kaiser is scheduled to submit plans for large, mass-production factory installations for future orders. Kaiser immediately launched a hiring program for workers for his aircraft and ship projects, recruiting thousands of workers from the New York area and expecting to draw additional thousands from the Midwest and Texas.

He got his experimental order after only two months of whirlwind publicity over his suggestion that he be allowed to build 5,000 cargo planes a year in nine converted shipyards.

Success in the form of an experimental order was assured when Nelson received three letters of recommendation urging that Kaiser and Hughes be authorized to build the three craft. The letters were written by Robert Lovett, assistant secretary of war; Rear Admiral John H. Towers, chief of the Navy Bureau of Aeronautics, and Harold Talbot, director of aircraft production of the WPB.

Wichita Engineering Company Builds Three New-Type Plywood Gliders for Military Training

D. H. Bolin, president of the Wichita Engineering Company at Wichita Falls, Texas, is attracting wide attention with three experimental military gliders his company has built. Successful testing is expected to result in quantity contracts from the government.

Bolin, whose key aides are Francis Harvey and Barney Ross, has used commercial plywood of white pine in constructing the gliders, which are two-place, side-by-side training craft. The gliders were patterned after an unnamed German sailplane, said to be one of Germany's finest, and therefore possess unusually high performance characteristics although they are essentially for training purposes.

The firm has lined up six subcontractors and three or four woodworking shops in anticipation of orders. Wichita Falls, where the work is being done, has long been internationally known as one of the nation's leading locations for gliding and soaring, and its Ross family has gained wide acclaim for their high-performance sailplanes.

Frederick G. Dawson (left) has been appointed general manager of the New Kansas City Pratt & Whitney Aircraft engine plant of the United Aircraft Corporation of Missouri. N. N. Oille (center), formerly with the Army Air Forces in setting up the AAF accounting system at some of the largest aircraft plant of the United Aircraft Corporation of Missouri. N. N. Globe Aircraft Corporation at Fort Worth. Charles H. Gale (right), veteran aviation writer, who recently resigned as editor of Sportsman Pilot, has joined the public relations staff of the Fairchild Engine & Airplane Corporation.

Littelfuse Be. Cu. Fuse Clips on No. 1505 Universal panel for glass enclosed fuses (3 AG, 4 AG, 5 AG) showing 1-pole and 3-pole types.

Defies Corrosion

Vibration Resistant
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Screwdriver test. Returns to perfect form.

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(1) Fatigue resistance
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(6) Triple the grip of best phosphor bronze.

Hundreds of thousands delivered to aircraft plants, Army and Navy.

TECHNICAL BULLETIN NOW READY!

Write for new bulletin giving complete technical data, properties, specifications, sizes, characteristics.

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Omaha, Neb. St. Louis, Mo. Tulsa, Okla.

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AIRLINES

Details of the sharp expansion of U. S. airline operations by the Army's Air Transport Command have been restricted, with the result that few realize the tremendous acceleration of passenger and cargo operations by the commercial carrier. Highlights of the boom include: Scores of new transoceanic schedules have been inaugurated by domestic carriers . . . Others are operating into Canada and Mexico and beyond. The Army is turning over large numbers of cargo planes to the airlines. American Export has proved itself with great accomplishments which would have been headlined in normal times. . . . 93 per cent of the air express business is closely related to war production.

Clarence Belinn, who's played a prominent role in U. S. air transport development, has opened a mainland office for Hawaiian Airlines, Ltd., at 5225 Wilshire Boulevard in Los Angeles, . . . Robert S. Swain of Dover, Mass., has been elected vice president and treasurer of Northeast Airlines. . . . Harold R. Harris has resigned as senior vice president of Pan American-Grace Airways to accept a colonel's commission for duty as plans officer on the ATC staff in Washington.

Iowa Wesleyan College at Mount Pleasant has inaugurated an extensive course in air transportation, with TWA co-operating by compiling an educational brochure which will familiarize students with airline work. The program calls for similar courses, keyed to secondary school needs, for 400 schools in Iowa, Missouri and Illinois. . . Chicago and Southern Air Lines for the fiscal year ending June 30, 1942, earned a net income of $128,959.28 after taxes, compared with a loss of $111,931.05 for the preceding year. Total surplus, which on June 30, 1941, showed a $51,307.65 deficit, was turned into a positive figure of $96,020.79 after distribution of one cumulative and four current dividends of 17½ cents a share on preferred stock and one fifty-cent dividend a share on common stock.

AIRLINE WORK was recognized by the Kansas City Chamber of Commerce when it presented plaques for outstanding war efforts to J. W. Miller, president, Mid-Continent Airlines; Paul E. Richter, executive president, TWA, and Charles E. Beard, vice president, Braniff Airways.

FIRST TRANSATLANTIC stewardesses are these pretty American Export Airline's aides of the "Flying Aces." Left to right are Margaret Siegfried, Kathryn Friedrich, Genevieve St. Mary and Adele Jenkins.

Air Cargo Expanding

Cargo by air is constantly spoken of as though it were non-existent today. T. E. Braniff, president of Braniff Airways, points out that this year the domestic scheduled air transport industry will probably operate between twenty and thirty billion pound-miles of air express, representing an increase of more than 200 per cent over 1941.

ONE-MAN FIRE trucks were made by Braniff Airways Engineer Roland Lewis from discarded battery carts. They carry asbestos suit, fire axe, crowbar, bolt cutters, shovel, welder's gloves and goggles, Pyrene powder, two extinguishers, flashlight, iron pail, 200 feet of sash cord and first aid kit.

Reynolds Metals Opens Dallas Office for Parts

Reynolds Metals Company recently opened a Dallas office in order to handle increased business in aircraft parts, resulting from expanded production.

Thomas Wilkes, formerly of Hills, California, and Louisville, Kentucky, has been appointed divisional manager in charge of the Southwestern territory.

By sending the finished product to customers instead of the aluminum necessary to make the parts, Reynolds Metals have been able to make an immediate salvage of 35 per cent of material which previously required two shipments, loss of manpower and time.

Gianelli at Texas Plant

A. E. Gianelli, formerly with the North American Aviation, Inc., purchasing office at Cleveland, Ohio, is now at the Texas plant of NAA in charge of all outside production purchases under W. T. Lyon, purchasing agent. E. J. Blume is supervising purchased labor.

Ernie Smith at Fort Worth

Aircraft Steel and Supply Company of Wichita, Kansas, has transferred E. L. (Ernie) Smith to Fort Worth to handle the increasing volume of business there.

Officials of New Tulsa Plant of Douglas Listed

Officials of the new Tulsa plant of Douglas Aircraft have been announced. They are: Harry Williams, plant manager; W. G. Jerems, assistant manager; Harry Ives, plant superintendent; David Dunlap, engineering manager; Frank Carson, personnel manager; K. G. Farrar, manufacturing engineer; R. C. Berghell, comptroller; Wendell Barnes, attorney; Burt Monesmith, material co-ordinator; Robert Hurt, plant engineer; R. W. Stevens, chief inspector; Captain Charles Sturtevant, plant protection chief, and Major Pendleton Edgar, Army Air Forces resident representative.

BOOK REVIEWS

Jane's All the World's Aircraft, 1941 Edition. Published by: The Macmillan Company, 60 Fifth Avenue, New York City. Price: $19.00.

Compiled and edited by Leonard Bridgman, this authoritative record of aeronautical progress throughout the world during the past year contains more fresh information than did its two wartime predecessors. It is the first edition for which Mr. Bridgman has been wholly responsible and its completeness in spite of many widespread restrictions testifies to the editor's skill and resourcefulness. It is a "must" in every aeronautical reference library.

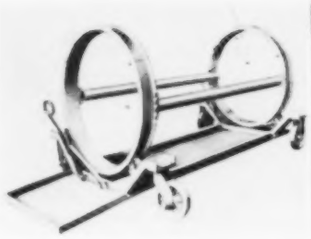
The book is divided into four parts covering the following: Part A—Detailed descriptions of the Flying Services of all nations; Part B—Developments during the present year of Civil Aviation in every country; Part C—Modern aeroplanes of all nations illustrated by photographs and scale drawings with complete specifications and performance figures of current types; and Part D—Aero-engines of all nations with photographs of every type and of the component parts of the more important engines.

Private Pilot's Handbook, by A. G. Norwood. Published by Pitman Publishing Corporation, New York and Chicago. Price: $2.50.

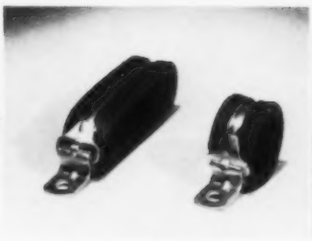
Mr. Norwood is a former educational specialist with the CAA, and the material in his book resulted from his experience in classroom instruction and in practical instruction in the air. Valuable information has been gathered, stripped of all non-essential mathematics and scientific verbiage, and assembled in a manner that will be tremendously helpful to every pilot and instructor.

Basic training information on the *Elements of Flight Theory, Meteorology, Aerial Navigation, the Use of Radio, Civil Air Regulations,* and *Flight Tests* is given in detail.

The book contains 258 pages and is illustrated with a number of explanatory charts and drawings.

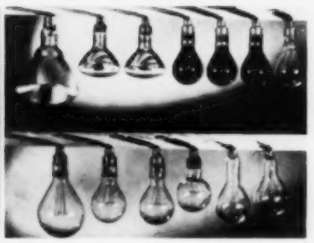


New assembly stand for large in-line engines allows access to all parts. Aviation Division, Whiting Corp., Harvey, Ill.



Unique latch allows jig assembly of electrical harness. Made by Adel Precision Products, Burbank, Calif.

Proper checking of moisture of aircraft wood possible with this register. Moisture Register Co., Los Angeles, Calif.



Clear, ruby and reflector type infra-red heat lamps form new line made by Wabash Appliance Corp., Brooklyn, N. Y.

NEW PRODUCTS

Oil Absorbent

The Trojan Products and Manufacturing Company of Chicago, Illinois, announces Quik-Sil, an oil absorbent compound five to ten times more potent than wood shavings which keeps floors dry and reduces slip hazards. The firm also has perfected Elektro-Purjit, a cleaning compound for machinery, skylights, windows, floors, sanitary fixtures, light reflectors and other surfaces.

Synthetic Cutting Oil

Machines making parts for airplanes, tanks, ships and guns are showing increased production and longer tool life with the use of a new industrial cutting oil recently perfected by scientists at the Gulf Research Laboratories, according to the Gulf Oil Corporation. In a recent demonstration, the new oil, known as "Cut-Aid," was used on a machine that was throwing up a plume of smoke while operating at 100 surface feet a minute. After "Cut-Aid" was added to the cutting lubricant, there was not a trace of smoke at 300 feet a minute. In another operation, tool life in a prominent Eastern plant was extended from three hours between regrinds to eleven hours in forming aluminum on a Brown and Sharpe automatic, reducing three-fourth-inch round stock to one-fourth inch. Finish improvement was declared to change from "fair" to "excellent."

Inflammable Stripper

To meet wartime industry's demands for greater safety and more speed, Turco Products, Inc., of Los Angeles, California, and Chicago, Illinois, has developed a completely noninflammable paint remover—Turco Stripper L-595. The fast-acting, wax-free paint remover can be used with complete safety near welding machines, electrical apparatus, grinding wheels and other equipment which generates heat and sparks.

NEW FASTENERS include Cherry Blind Rivets (left) and Nigg Cowl Fasteners. Brazier and countersunk Cherry's have proved highly successful in pressurized-cabin work. The Niggs accommodate various sheet thicknesses.

Thiokol for Strippings

The Felt Products Manufacturing Company of Chicago announces successful application of a new substitute, Fel-Pro Thiokol, for critical materials formerly used in gaskets and strips. It has been made weather resistant and is produced in lengths well over six feet. The manufacturers say the material is available in quantity.

Metal Return Sought

The American Foundry Equipment Co., 555 S. Byrkit street, Mishawaka, Indiana, has announced a rebate of 10 cents per pound, FOB Mishawaka, on high alloy steel parts of Wheelabrator airless abrasive blast cleaning units. The parts sought are labelled "AR," and contain chromium and much molybdenum. Return of the worn parts will conserve metals and also forestall machine difficulties that might ensue if the "AR" metal were remelted with other scrap.

Fire-Gas Extinguisher

A new fire and war gas extinguisher, announced by the O. H. Adams Company of Milwaukee, Wisconsin, has been recommended by the manufacturer as being effective against gases as well as in extinguishing flames. It is said to be a decontaminator for chlorine, phosgene and chloracetophenone tear gas.

Field Depots Speed Warplane Repairs by Using Explosive Rivets

Explosive rivets are speeding field repairs of damaged planes at military depots. E. I. du Pont de Nemours & Co., reports the rivets, containing a shank filled with a small amount of high explosives which are detonated by heat to set the fasteners, are installed by one workman at a rate of fifteen to twenty per minute. Repairs to bullet holes and gashes in bomber and fighter planes are being completed in hours whereas they formerly required days.

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SPEED AND ECONOMY

We Are Making Dies for Many of the Leading Airplane Plants.

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Excellent Opportunity
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CHIEF INSPECTOR
With Aircraft Company
Holding AA-1 Rating Operating
Under Government Prime Contract
Wood — Steel — Fabric Construction
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FAHLIN MFG. CO. COLUMBIA MO.

REPAIR SERVICE

- For All Types and Makes of Propellers
- 2-7 Days at the Factory
- CAA Authorized Station

FAHLIN MANUFACTURING COMPANY

ATC Making Plans for Pilot, Mechanic Deals

The Air Transport Command has opened the Airline War Training Institute at 1616 K Street, N. W., Washington, D. C., under the direction of S. J. Solomon with Jerome Lederer as executive assistant. Preliminary work on training projects for both pilots and technicians is being pushed. NATA mechanic school members are co-operating.

Swamped by Military, CPT Finally Goes All-Out With Program to Utilize All Available Facilities

Orders for "tens of thousands" of CPT courses have been received by the Civil Aeronautics Administration from the Army and Navy, bringing the total number of courses contracted for to over 110,000 and requiring "almost complete" utilization of all existing CPT facilities, including fields closed down under twenty-four-hour guard regulations.

The biggest obstacle is finding instructors for the elementary course. The CAA says that large numbers of light planes, many of them in storage, could be purchased by CPT operators, but added that "it will be necessary to train several thousand instructors before these ships can be used." Regional staffs are busy on plans to start the ball rolling.

The increased quotas apply to all five categories in which CPT training is being given. All persons now being trained by the CAA are either Army or Navy enlisted reservists, thereby placing the training program on a complete war footing.

Men up to thirty-six years of age are eligible for the CAA-Army courses. They receive room and board and insurance while in training, and on completing their courses may qualify for a commission. Applicants must pass mental and physical examinations which are not as severe as those given candidates for combat pilot training. No previous flying experience is required, but those who are already pilots may enter training at an approximately advanced stage.

CAA-Navy trainees must be accepted by a Naval Aviation Cadet Selection Board, but experienced pilots up to thirty-two years of age will be admitted for training as instructors or transport pilots, with a probationary commission as ensign or lieutenant (j g) given, as soon as training starts.

Brazilian Publisher Organizes 326 Flying Clubs in Eighteen Months

A chain of 326 Brazilian civilian flying clubs has been organized in the last eighteen months as the result of a campaign conducted by Assis Chateaubriand, president of a group of sixteen newspapers known as Associated Newspapers, the largest newspaper group in Brazil. More than 200 planes have already been donated to flying clubs by readers, and 100 more planes are expected to be received by the end of the year. Some 600 civilian pilots have been trained and 500 more are receiving instructions.

In some instances, local financial assistance is obtained by the clubs from municipal authorities. Planes usually are obtained as gifts through donations by prominent citizens, merchants and others. Employes of the Bank of Brazil are donating one plane each month to the clubs.

Interstate President "Does the Impossible" for Mexican Air Force

Don P. Smith, president of Interstate Aircraft and Engineering Corporation, light plane manufacturer now turning out military craft on government order, recently conducted a nationwide search which netted the Mexican Air Force a much-needed training plane for pilot instruction. Advised of the fruitless efforts of the American Society of Mexico to buy a plane to present as a gift to the Mexican Air Force, Smith hurriedly checked all Interstate agencies, dealers and friends and finally tracked down a new plane at Philadelphia. It was sold at cost to the American Society of Mexico, and Interstate went to the expense of ferrying the trainer to Mexico City, with Wholesale Sales Manager Carleton Darneal at the controls.

Inter-American Model Plane Project Launched

Plans for 300,000 model planes covering fifty types used by major belligerents at war, have been supplied the various Western Hemisphere republics from the United States in a model plane building program directed by the Inter-American Escadrille to assist the other Americas in their military and civil defense endeavors.

British Have Destroyed 10,000 Axis Airplanes

Peter Masefield, air correspondent of the London *Times*, reports that the British have destroyed 10,000 Axis planes since the beginning of the war. British losses for the period, up to September 5, have totaled 6,500.

Huge Gliders Reported Building in Germany

Reports of large-sized gliders in use by Germany have recently included mention of 100-passenger motorless craft. Simultaneously, the Society of British Aircraft Constructors told of Swedish information listing the foremost German glider now in production as having a wing span of 80 feet, empty weight of 3,000 pounds and a disposable load of 5,000 pounds.

Services Rush Air Ambulance Programs

Army and Navy plans for providing large-scale air-ambulance service in battle areas call for large "flying hospitals" for the Army, fed by light plane ambulances and sea-ranging Navy flying boats to supplant surface vessels in rescues during naval air combat.

Brig. Gen. David N. W. Grant, air surgeon of the Army Air Forces, told the recent meeting of the Aero Medical Association that the Army now is training three hospital plane squadrons—two of long-distance planes and one of light planes. The small ambulances will jump wounded men five to twenty miles from the front lines to waiting transport hospital ships. In this manner the Army will try to assure wounded soldiers a chance to get back to a fully-equipped hospital in the "golden" period—the first few hours during which his chances to live are double or tripled, if he is treated. General Grant also reviewed accomplishments of the Army in the Far North, saying 500 sick and wounded had been flown out of Alaska and that others already were being flown from other distant areas. Every troop transport and cargo plane can be converted to hospital transport, he said.

Tanks Supplied by Air

During the recent Army maneuvers in the California desert, C-47 transports of the Air Borne Command resupplied a "lost" tank battalion by parachute. Quantities of gasoline, oil, water and rations were dropped after the pilots located the ground force.

Towers Made Commander of Fleet Air Force

Rear Admiral John H. Towers has assumed duties as commander of the Pacific Fleet Air Force, with rank of vice admiral. He was succeeded as chief of the Bureau of Aeronautics by Rear Admiral John S. McCain, fifty-eight, who left an air command in the Pacific to report to Washington.

Kenney Succeeds Brett

Major General G. C. Kenney has succeeded Lieut. Gen. George H. Brett as commander of Allied Air Forces in the Southwest Pacific. General Brett is back in the States.

Wanted: Bigger Bombs

Reports from England of successes by the RAF with 8,000-pound bombs have been followed by recommendations by Alexander P. de Seversky that much larger ones be used. Now on the radio network as an "air war" commentator, Seversky says a 10,000-pounder would do far more damage than five 2,000 pounders. Big delayed-fuse bombs, dropped from higher altitudes in precision bombing, strike with much more velocity, penetrating deeper into the target area to create a veritable earthquake upon exploding, while lots of smaller ones are wasted unless exact hits are scored. Bombs of 4,000-pound weight have been used widely by the British but 2,000-pounders are the biggest reported used to date by U. S. bombers, except in pre-war tests.

ME 109-G Reported

Germany's newest Messerschmitt, the 109-G, has been described by the Russians as differing from earlier models in that its armor is heavier. It fires three cannons and two machine guns and is powered by a 1,700-h.p. engine developing 250 miles m.h.p. at 3,000 feet and 325 m.p.h. at 12,000 feet.

Women Pilots Get Chance To Ferry Army Planes with New Auxiliary Organization

To utilize the abilities of women pilots, the Army has appointed Jacqueline Cochran as director of women's flying training within the Air Forces and has formed the Women's Auxiliary Ferrying Squadron to ferry planes inside this country.

Miss Cochran will be in charge of a program designed to create a pool of trained women pilots from which will be drawn personnel for noncombatant flying, to release as many men pilots as possible for combat duty. She will direct the training of women in cross-country flying, navigation and other courses to equip women for ferrying and other duties. She recently returned from England where she took numerous American women pilots for service with the British ferrying operations.

The WAFS is commanded by Mrs. Nancy Harkness Love, well-known for her ferrying of airplanes to Canada for delivery to the British. Her husband, Lieut. Col Robert M. Love, is deputy of staff of the Air Transport Command. Tentative plans call for ultimate expansion of the WAFS to include all women pilots available, it was explained by Maj. Gen. Harold M. George, ATC commander. They will ferry light planes for a start and later will handle large types. First assignments included a special course of from four to six weeks to familiarize girls with military aircraft, military organization and procedure. They are on civil service status.

The WAFS is based at New Castle Army Air Base, Wilmington, Delaware, and is quartered in barracks. Their pay is $3,000 annually and special uniforms are being designed for them.

Applicants should inquire by letter to the Air Transport Command, Army Air Forces, War Department, Washington, D. C., or, if they meet the requirements listed below, they may inquire directly of Mrs. Love, director of women pilots, New Castle Army Air Base, Wilmington, Delaware.

Qualifications were announced as follows:

Must be an American citizen between the ages of twenty-one and thirty-five, with at least 500 authenticated hours as pilot, fifty of which have been logged within the last twelve months; must have at least 100 hours on airplanes of 200 horsepower or greater, fifty of which hours must have been solo; must have currently effective commercial pilot's rating of 250 horsepower or more; must be able to pass a flight test given by an Army officer.

The first eight WAFS members accepted are: Mrs. Betty Huyler Gillies of Long Island, N. Y., former president of the Ninety-Nine Club of Women Aviators and mother of two children; Miss Cornelia Fort of Nashville, Tenn., who has been instructing in flying at various ground schools for more than a year and was in Pearl Harbor on December 7; Miss Aline Rhonie of New York City; Mrs. Catherine Slocum of Bryn Mawr, Pa., the mother of four children; Miss Teresa James of Wilkinsburg, Pa.; Mrs. Helen Mary Clark of Englewood, N. J., the mother of two children; Mrs. Esther Nelson of Long Beach, Calif., whose husband also is in the Ferrying Command, and Mrs. Adele Scharr of St. Louis, a school teacher.

ROUGH WATER tests were passed with flying colors by the Navy's new Curtiss Seagull scout, made at Columbus, Ohio. It is the fastest battleship and cruiser-based plane in the fleet.

Houston Continues to Improve Its Airport

During the last eighteen months the Houston, Texas, municipal airport has received improvements costing $1,007,229.22 and including a 368-acre addition, three paved 4,500-ft. runways and a fourth 4,672 feet long, each 150 feet wide; paved taxi strips; extensive underground drainage and lighting and a new hangar. Improvements under way include enlargement of loading ramps.

Mayor C. A. Pickett said the airport will be improved to accommodate the postwar boom in air transport of freight, cargo and passengers.

Eaker Indicates AAF Drive on Germany

A second front in the air over Germany will be a reality "within the next few months," Brig. Gen. Ira C. Eaker (later promoted to major general) indicated recently in London. The chief of the AAF Bomber Command in the European area said adequate bomber forces are being rapidly assembled and there are enough air bases "built and building" in England for the task.

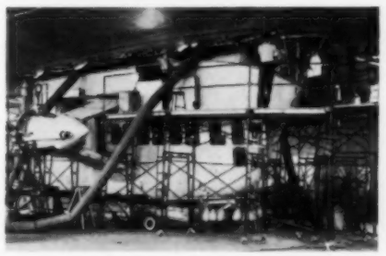
"I believe it possible to destroy the enemy from the air," Eaker said, adding that the winning side will be the one with the biggest and most effective air force.

—Bette Barber Photo.

PRINCE BERNHARD of the Netherlands last month inspected men and equipment of the East Indies Air Force in training at Jackson, Mississippi, for another crack at the Japs. Queen Wilhelmina is expected to inspect the airmen soon.

Blimps in Mass Production

DOUBLE-HEADER delivery of airships from Goodyear Aircraft to the Navy began recently at Wingfoot Lake, Ohio.



MASS ASSEMBLY of blimps is expedited by rollaway scaffolding replacing "horses" and planks.

Snap-On Opens in Dallas

E. L. Spencer, district manager of the Snap-On Tools Corporation, is now headquartered in Dallas and is covering the Mid-American territory from New Orleans to Minneapolis. Spencer has been with Snap-On for fourteen years.

MUNITIONS SAMPLES are speeded on cross-country deliveries by New Jersey CAP pilots using an Aeronca. Their "cargo" is literally hot, for the samples were rushed from heat-treating to a proving ground for immediate testing.

Dallas, Texas

Jean Foote Favors Women Instructors

On tour with Tony—Love Field—Reagan Stunkel, Lockheed West Coast, and Don Marshall, who runs up the seams in Big D, were working like Marines in action one Sunday right in the middle of dove season—another score against the "yellowmotos" . . . Allan Guiberson and Carl "Lightnin'" Brockman have been almost daily visitors at Hangar Ten. . . . Winston Castleberry, who is so busy with the Army, says, "Oh gosh! nothing I can talk about!"

Buck Rowe, flying the new Stinson . . . a super job in the Gulf colors . . . Lieut. Desmond A. Barry from Houston, is now the head of the Air Depot Detachment, Braniff Airways, Inc. . . . likes Dallas weather . . . Tom Collins, Aviation Credit Corporation, had a cuppa coffee and told us that he was off on a Mexican jaunt . . . clear down to Mexico City to see the senoritas and bend an elbow over a quail dinner, no doubt . . . Don Crosby, of Houston, flew up and waited in the coffee house while his new Waco was getting a drink of gas . . . "Doc" Watson took over for Paul Jackson (Army now) under the Crosby banner . . . Major Chas. S. Detweiler cooled his heels for a time awaitin' a plane from San Antonio . . . Lieut. Howard West was *not* the pilot.

Hudson Airport—Everybody had gone fishing SOUTHERN FLIGHT day, to celebrate finishing up the Army students in just enough time . . . . Lewis White doesn't like to fish, so he stayed around . . . Henschal Browning and Richard Covan have been giving the music box a fit, which is the usual thing to do, and the "honor system" cash drawer for the pop box is way ahead, proving something or other.

Lou Foote's Airport—Jean Foote will be the happiest one to hire women instructors for every department. Jean is a top woman pilot in her own right, and knows the waste in not using women instructors. All the gals who are eligible, please report in slacks, ready for action . . . Frances Walton got the last solo from D. C. "Doc" Nogues at the Foote Airdrome. "Doc" is off to Kelly Field, a commission man now, and Frances is working up to get on the Ferrying Command . . . Dorothy Mehlman got appendicitis on her day to solo . . . bad break, Dot!

Mustang Field—the "Mustang mulebarn," quoting Charlie Wilson, is getting a good play from private pilots, especially one very nice number who is known as Jimmie Leah Holekamp . . . honors in the "cutie pie" department go to Millicent Everts . . . both have the makin's of fine pilots.

Warren Christ and Eugene Shackleton, who instruct the Navy class, and I. G. Shower and Charles Wilson, who give out knowledge to the Army class, have a bench which would be the envy of every instructor from here to Fort Worth if they knew about it. Said bench has the missing cushions from all the planes on the field . . . very comfortable indeed.

Jack Lake, the prop and A & E man who gets letters from Hamilton Standard of East Hartford, Connecticut, addressed c/o Passionate Meadow, Dallas, Texas, has moved over to (one guess) Love Field. He is on the payroll of Southwest Airmotive, and they have a mighty good man in two words . . . a killer-diller to trouble. N. T. Womack, boss man, and Harry Sellers corral the Mustang pilots.

White Rock Airport—Joe Hinckley, who instructs from this airdrome, has Miss Vega Johnson with the yen for the Ferry Command. If it hadn't rained, Wayne "picture on the wall" McWhirter would have been here to help Vega take her Commercial test, too. Everybody wants her to be the first White Rocker gal to be eligible . . . "Squads right" Jimmy Kasal, salutes (KY) Colonel Dick Clark . . . while Austin Ivy winds up the prop for De Sha Sims of Indian Territory . . . Message of the month is from "Bar" Robertson, the hot shot of African dominoes around these parts, who says: "Kelly, here comes me!" . . . so it goes.

TONY HAGMANN

Enlist in your CIVIL AIR PATROL

Fort Worth, Texas

CAP Studying Navigation Problems

We've been "off your beam" for the past month, due to a wedding . . . "I, Margaret, take Arnold Bowman, etc., etc." (no relation to the flying Bowmans) . . . But seriously, folks, thanks for all your good wishes—and I am happy to be back.

Civil Air Patrol pilots and observers inaugurated the first of a series of triangular flights on a navigation-observing problem from their flying base to Waxahachie, Parker Airport just south of Cleburne, and back home.

Cecil Black, of the Acme Coffee Company, passed the CAA navigation course after studying only four nights, which we believe is something of a record . . . Phillip Card, flying student at Southwestern Baptist Theological Seminary who has logged several hours toward a private license, has recently been inducted into the Army at Camp Wolters . . . Added to Singleton's "just soloed" are Earl Green and Luther Herring, while Sue and Joe Carson are making good time toward their initial flights alone at the controls.

Reporting to Kelly Field at San Antonio as trainee instructors, having won their instructors' ratings recently at Fort Worth Aviation School, are Russell S. Brownover, Milton Douglas and Glenn R. Grecar. At the same time, Robert A. Farmer and Oran S. Lanham became instructors in the school's CPT program, and two more Fort Worthers, Donald B. Grouse and Jessie M. Ray, are winding up their CPT instructors training . . . Newest class at Fort Worth Aviation includes John A. Garris, Eddie Vinson and Louis S. Haney, of this city.

Bob Singleton made the longest cross-country flight of any private flyer here in several days, when he hopped to Brownsville with his father, J. B. Singleton. Returning, the fliers stopped at Corpus Christi to see Lieut. (j g) Chester Chenault at the Naval Air Base. Lieut. Chenault was an instructor at Singleton Field before enlisting in the Navy.

Four non-commissioned officers from Fort Worth and one from Coleman have been admitted to the Air Forces Officers' Candidate School at Miami Beach, Florida. Completion of an intensive twelve-weeks' course, puts the candidates in line for commissions as second lieutenants. The Fort Worthers are Corp. Garland G. Wiers, Corp. Claude D. Richardson, Technical Sgt. George Milton Oliver, and Corp. Charles B. Bardin.

Newest aviatrix at Meacham is Gwen Burton, who has her private license and is now going after her instructor's rating at Ritchey's . . . Fledglings winding up their primary training at the school include: Harry T. Bibb, George Whyte, Ed McNallen, Ed W. Hamann, Alfred and John Yarbrough, Tommy Whitecotton, Robert Flanagan, Harry Gilbert and Victory Jamison.

MARGARET EWING BOWMAN

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Robertson, Mo.

Kansas City, Missouri

CAP Officers Assigned Rankings

Civil Air Patrol—The staff officers of CAP Group No. 733 have been assigned rankings from the War Department and are wearing full Army uniform and insignia. Dr. Frank E. Day was commissioned captain, and a number of others became first lieutenants. The group, with members in Kansas City, Branson, Carthage, Joplin, Marshall, Nevada, Springfield and Warrensburg, now have an organization complete with approximately seventy-five private planes, ground crews, mechanics, ambulances, hospital and first aid groups.

Schools—They're making them tough! The Air Corps mechanics in training at the Missouri Aviation Institute on the Municipal Airport not only spend eight hours a day in class and shop but in addition are putting in a half hour daily on a strenous obstacle course opened alongside the barracks during September. Included in the hazards are: two eight-foot ditches, low hurdles, an eight-foot wall, a sixteen-foot ladder, a mound of earth, twenty-foot tunnel, crawl-under platforms, balance beams, leap-frog posts and a four-foot vaulting fence. . . . To offset a wartime shortage of weather observers, a class of instruction in the City Hall was established for the convenience of the CAA. Eleven women and four men attended the first class of a seventeen-week course, with J. T. Arnold, meteorologist, as instructor . . . The preliminary and advanced flight courses of the civilian pilot training program opened September 7th with Ong Aircraft and the Kansas City Flying Service in the city undertaking the training of local applicants.

Visitors—The Missouri River at the Municipal Airport was the landing spot for a seaplane which had been making river port landings since leaving West Virginia bound for the Coast . . . General H. H. Arnold and Lieut. Gen. Ben Lear were American Legion visitors at the annual convention here September 19, 20 and 21 . . . Army Flying Classrooms, fitted into twin-motored monoplanes slipped into the Municipal Air Terminal one Sunday, unloading their Navigation Cadets for a brief rest . . . Wayne W. Parrish, editor of AMERICAN AVIATION, addressed an overflow crowd at the opening fall luncheon which was sponsored by the Chamber of Commerce in cooperation with the Kansas City Unit of the WNAA, the NAA and the Ad Club . . . Guest speaker at a Chamber of Commerce luncheon was Fred G. Dawson, appointed general manager for the Kansas City Pratt & Whitney division airplane engine plant of the United Aircraft Corporation . . . Warren Blazier, personnel director for Beech Aircraft Company at Wichita, was chairman of a special meeting called in Kansas City, with twenty-eight aircraft companies represented, to determine a means of preventing piracy and the loss of skilled key men of the aircraft industry to the armed forces.

WNAA — As their October project, the Kansas City Unit of the WNAA has chosen a campaign for Aviation Literature which is to be distributed to flight and mechanic training schools. Back issues of all aviation magazines, books on aviation and related topics such as meteorology, navigation and manufacturer's house organs are among the desired loot to be forwarded to NAA headquarters in Washington, D. C., for distribution . . . Neva Rea qualified for her private pilot's license . . . Jewel Stanton, out-of-town member, was appointed chief flight commander of the Civil School at Spartan School of Aeronautics . . . Miss Doris Jane Leeds, active in CAP work while in Kansas City, was among the successful first class of commissioned third officers of the WAAC's . . . Jenice Kingsolver Winton flew to Carapita, Venezuela, to join her husband.

MARION MELCHER

Enlist in your CIVIL AIR PATROL

Lawton, Oklahoma

Jimmy McNulty Joins Ferry Command

Jimmy McNulty has resigned his instructing job to become a member of the Army Ferry Command. In his last letter to the Lawton "hangar rats," he stated that he had made a cross-country flight as co-pilot on a B-35.

The following students recently soloed: Russell Brookshire, David Edward, Oscar Heurser, Ernest Holzapfel, James Roberts. Henry Swinney, Edwin Wiggs, Robert Weaver, George Hamilton, Sylvia Pavlovich, Joe Howenstine, and Glen Powers.

Several ships have been added to Duane Huscher's collection. Mr. Huscher, who is airport manager, now owns about fifteen planes, but there aren't enough to go around, with so much outside flying and the government contracts.

A very welcome letter has been received from Theodore Swain, (readers will recall Mrs. Swain as a former Ports of Call correspondent) announcing his safe return from a ferry trip to Australia.

One of those guys "who wear a pair of silver wings" dropped in and lured away five local pilots, to be trained as Army instructors. The five: Malcolm Landrum, Joe McDonald, Roy Easton, George Howard, and Paul Deaton.

Lew Gourley, who instructed here for a short time, is now flying for the Department of Agriculture. He stopped here recently in a Pitcairn Autogyro. He insisted that he

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You must have a "Commercial" rating, 0 to 250 horsepower.

You must pass the Army flight test, given by an Army officer.

Applications accepted by the Second Ferrying Group **only.**

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learned to fly it through a correspondence course.

Know anybody who has an old beat up hangar he wants to get rid of? Boy, do we need one! The municipal hangar is full, with two ships staked out.

DOROTHEA WALKER

Enlist in your CIVIL AIR PATROL

Oklahoma City, Oklahoma

CAP Starts New Course of Instruction

Lieut. Burns P. McAtee, of the public relations office of the Midwest Air Depot, was the principal speaker at the last regular meeting of the Oklahoma City Aviation Club. After hearing Lieut. McAtee's message we can better appreciate the importance of the depot, not only to the state of Oklahoma, but to the entire southwest section of the country.

"Uncle Jimmie" Brazell is having a service flag made in honor of all Oklahoma City Aviation Club members in service.

The Oklahoma City group of the Civil Air Patrol began a new course of instruction last month. Many members hope to qualify for active duty soon.

MRS. B. D. SPONHALTZ

Enlist in your CIVIL AIR PATROL

Phoenix, Arizona

Storm Emphasizes Hangar Problem

Private plane owners here are conferring with city officials over the problem of overcrowded hangar facilities at Sky Harbor Airport, with a recent sudden early-morning storm which damaged more than twenty planes. Hangar space is so insufficient that many ships must be left standing outside at the mercy of whatever surprises the weather may whip up. The airport's housing problem became acute when the U. S. entry into the war resulted in the halting of civilian flying on the Pacific Coast, many Californians moving their ships here . . . Plane owners hope the city can build more hangars of non-strategic materials, with space rentals to pay off the construction costs within a year. It is not entirely the private flyers' problem, since many of the planes damaged were used in the CPTP.

Civil Air Patrol activities continue to occupy most of the city's birdmen. The CAP recently had its first experience with aerial pickup of messages, and now is putting in formation flying practice and studying navigation problems. Many members soon will be through with their training courses. A. Lee Moore, local CAP member, just back from thirty days' active service in sub hunting, had plenty of yarns to recount to fellow pilots.

Andy Anderson, local radioman and for years one of the city's most enthusiastic flyers, has entered the Army Air Force, and at last reports was taking a refresher course at Moffett Field, California . . . Glider pilot training programs under the CPT setup are under way at Phoenix, Prescott and Globe . . . Recent activation of Thunderbird II gives the Phoenix area two primary and two advanced air force training schools, plus the British training base at Falcon Field. Thunderbird II is operated under Army contract by Leland Hayward and Jack Connelly, guiding geniuses of Southwest Airways, Inc., which operates Thunderbird Field, Falcon Field, and CPT work at Sky Harbor . . . The part of White's Flying Service, operated by Johnny White at Sky Harbor, in training CPT flyers also is expanding steadily. White recently added instructors' refresher courses to his curriculum.

BOB ALLISON

Shreveport, Louisiana

New Class of Navy Flyers

A new class of future Navy flyers now undergoing training are Willis Thorpe, Stanley Reynolds, George Hollowell, James Shaw, Joe Stewart, William McKeithem, Vincent Winel, Horace Theriot, Loro Coppenjans, Inmon Bledsoe, Kyle Jones, John Loden, Dudley Smith, Bob Roscoe, Donald Weems, Reece Klob, Raymond Mason, William Ravell, Herbert Holland, James McDonald, Otis Thomas, Kenneth Finka, G. Faucheux, Harry Wolking, Emmett Shaw, Goldwyn Gauthier, Walter Andrews, and Robert Smith.

"Navy Organization" was the subject of a talk by Chief R. M. Ayers of the local Navy recruiting office who was guest speaker at a recent WNAA meeting. Mary Neal, Louisiana governor of the organization, vacations in Evansville, Indiana, this year.

The last pilots' roundup was held in Kilgore, Texas . . . from various reports it seems that most of the group attending had a very good time indeed . . . Next month we'll report on the one to be held in the old home town.

MARJORIE HARDMAN

Enlist in your CIVIL AIR PATROL

Hawthorne Expands Training Facilities

Expansion of Hawthorne Field at Orangeburg, S. C., has been made necessary because of the increased number of cadets at the Hawthorne School of Aeronautics and the resultant stepping up of flight operations. Several new barracks were recently constructed and a new auxiliary airport, Hagood Field, was opened to cope with this increased activity.

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Big New Combat Crew School to Open Soon at Fort Worth

Preparations for the official opening of the Army Air Force Combat Crew School at Tarrant Field, Fort Worth, Texas, are speeding ahead under the direction of Col. James S. Stowell.

Instructors, many of whom recently have completed refresher courses at the four-engine school at Smyrna, Tenn., are arriving daily to take over their new assignments. With training plans and schedules well formulated, flying operations and instruction of officer pilots is scheduled to get under way by mid-October.

Construction of all installations of the big base situated west of Fort Worth is nearing completion and all activities now are coordinated.

Col. Stowell organized the Army Air Forces Officers Candidate School and the Officers Training School at Miami Beach, Fla., and was relieved from that assignment to assume the duties of chief of staff of the First District, Army Air Forces Technical Training Command at Greensboro, N. C. He assumed command of Tarrant Field on September 14.

Douglas B-24 Plant at Tulsa Also Modifies Fortresses

The Douglas Aircraft Company's big plant at Tulsa, Oklahoma, is steadily increasing its production of Consolidated B-24 bombers. In addition, the plant is also working on Boeing B-17 Flying Fortresses, converting them for different assignments than they were originally designed for. Nature of the conversion is secret.

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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912, AND MARCH 3, 1933, of SOUTHERN FLIGHT, published monthly at Dallas, Texas, for October, 1942.

State of Texas,
County of Dallas,
ss

Before me, a Notary Public in and for the State and county aforesaid, personally appeared R. T. Gidley, who having been duly sworn according to law, deposes and says that he is the Business Manager of SOUTHERN FLIGHT, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August, 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to-wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher: Air Review Publishing Corporation, Dallas, Texas.
Editor: George E. Haddaway, Dallas, Texas.
Business Manager: R. T. Gidley, Dallas, Texas.

2. That the owner is: (if owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

Air Review Publishing Corporation, 1901 McKinney Ave., Dallas, Texas.

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4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is: (This information is required from daily publications only.)

(Signed) R. T. GIDLEY,
Business Manager.

Sworn to and subscribed before me this 16th day of September, 1942.
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Benefits for CAP Members Sought from Congress

Bills are pending in both branches of Congress which would provide benefits for injury, disability, death or enemy detention to Civil Air Patrol pilots while on duty. The general intent of the bills is to aid all those injured or killed in performing civilian defense work, and CAP is specifically mentioned.

Sponsored by the administration, the Senate bill is S-2620, introduced by Senator Pepper of Florida, and is now in the Senate Finance Committee. In the House, Representative Celler, New York Democrat, introduced a companion bill which is pending in the House Banking and Currency Committee. The benefits are retroactive according to the wording of the bills as they stand at present.

Enlist CIVIL AIR PATROL *in your*

CAP Membership Now Totals 58,554

In the month of August, 2,730 membership Civil Air Patrol applications were received at national headquarters. The total to August 31 is 58,554. Allowing for those who have gone into the armed services and other branches of aviation, it is believed that the net gain in membership is several hundred per month.

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